

**Emotion Regulation and Borderline Personality Features**

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award of Doctor of Philosophy**

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### **STUDENT DECLARATION FORM**

I declare that while registered for the research degree, with the University's specific permission, I was enrolled for the following awards: Teaching Toolkit. I declare that no material contained in the thesis has been used in coursework for the aforementioned awards or any other submission for an academic award and is solely my own work.

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## **Abstract**

Despite evidence showing that emotion dysregulation is a key feature of Borderline Personality Disorder (BPD), it remains unclear *how* the process of emotion regulation is disrupted in this population. This thesis makes an original contribution to knowledge by exploring *how* emotion regulation is conducted by individuals with high levels of Borderline Personality Features (BPF), in an attempt to clarify the features of emotion regulation that may be problematic for these individuals. This was achieved using a multi-methodological approach with student samples to investigate several aspects of emotion regulation that have been identified in the literature as being important for emotion regulation success in relation to BPF. Study 1 investigated the overall experiences of emotion regulation and the types of emotion regulation strategies used by individuals with high levels of BPF using semi-structured interviews. Study 2a built on findings of Study 1 by quantifying the type and number of strategies used for positive and negative emotion regulation attempts using self-report questionnaires. Study 2b investigated the intensity of emotions when regulated and the duration of emotion regulation attempts using Experience Sampling Methodology (ESM). The final study, Study 2c, investigated implicit valuing of emotion regulation and emotion utility using two computer-based implicit tasks.

Findings from studies 1 and 2a demonstrated that although individuals with high-levels of BPF demonstrate knowledge of a range of strategies, they appear to select and implement more unhelpful strategies and less helpful strategies. Moreover, this was found for the regulation of negative and positive emotion regulation. This finding provides evidence for a sufficient knowledge of emotion regulation strategies in this population, an area currently disputed within the literature. Additionally these findings address important gaps in the literature regarding positive emotion regulation and the use of helpful strategies in this population, areas neglected in past research.

Findings from study 2b demonstrated that individuals with high levels of BPF appear to regulate their negative emotions when emotion intensity is higher. Theoretically, this indicates that these individuals attempt to regulate their emotions later in the emotion generation process, when intensity is high. However, BPF did not predict an increase in the duration of negative emotion regulation attempts, despite past research demonstrating that longer periods of emotion regulation may be necessary when emotion intensity is high. Together these findings highlight two potentially problematic areas of emotion regulation for individuals with high levels of BPF; timing and duration of emotion regulation attempts. Past research suggests that this pattern of emotion regulation influence emotion regulation strategy choice and limits emotion regulation success. In addition, it was also found that BPF predicted shorter durations of positive emotion regulation attempts. The investigation of positive emotion regulation has been largely neglected in the field of BPF. Thus this finding makes a unique contribution to the literature by indicating that these individuals may also demonstrate disturbances in positive emotion regulation processes.

Findings from the final study, Study 2c, suggest that individuals with high levels of BPF do not differ in their implicit evaluations of emotion expression or emotion control, suggesting that implicit motivation for emotion regulation is not disrupted in this population. However, it was found that these individuals implicitly perceive avoidance emotions, such as worry or nervousness, as unhelpful when faced with a threatening task. This suggests that these individuals may demonstrate deficits in their understanding of emotion utility and ability to use emotions effectively.

Overall, the research included in this thesis makes an important theoretical contribution to the literature by identifying specific features within the emotion regulation process that may be problematic for individuals with high levels of BPF. The

identification of these features has important implications for non-clinical support services by highlighting specific targets for treatment. These findings may also be useful in informing clinical interventions for emotion dysregulation, subject to replication in clinical populations.

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# **Chapter 1 -The Borderline Personality Construct**

## **1.1.Overview**

The term borderline personality disorder (BPD) was first introduced into psychiatric diagnostic manuals in 1960 and has been included in all revisions of the DSM including the recent publication of DSM 5 (APA, 2013). Since then BPD (personality features meeting current diagnostic criteria) and borderline personality features (BPF; prominent features of BPD which may fall below diagnostic thresholds), have been heavily researched to establish the cause, course and associated problems in order to inform the development of effective interventions. This chapter will explore what the term ‘borderline personality disorder’ means and where it originated. Literature on the prevalence and cost of BPD and BPF is then examined to establish the size and nature of the problem. Following this, biosocial theory, a seminal theory of the development and maintenance of BPD will be introduced and evaluated. Finally, there is an exploration of literature on emotion regulation and BPF to identify potential areas for emotion regulation problems. These factors will be considered further in the context of the broader literature on emotion regulation in the following chapter.

## **1.2.What is Borderline Personality Disorder?**

### **1.2.1. Origins of the term Borderline Personality**

The term ‘borderline’ was first used to describe a group of individuals who did not respond to treatment and who appeared to be on the ‘borderline’ between the two major psychiatric classifications: neuroticism and psychoticism (Stern, 1938). The term ‘borderline personality’ was more specifically defined by Kernberg (1967) when describing the borderline personality organisation. Borderline personality organisation refers to a broad level of personality functioning including several problematic personality features including poor identity formation, primitive and intense emotion,

and reality testing which relapses under stress. *Poor identity formation* refers to the individual demonstrating difficulties in establishing a stable sense of who they are, independently of the situation around them. *Primitive and intense emotion* refers to the strong emotions experienced by these individuals, which are highly reactive to their environment and may be difficult to control. Finally, *reality testing which relapses under stress* refers to a tendency for the individual to experience an unstable sense of reality when put under stress (Clarkin, Yeomans, & Kernberg, 2007; Gunderson & Links, 2008). Although these three components are still central to current definitions of Borderline Personality Disorder (BPD), it was work by Gunderson and Singer (1975), identifying six characteristic features of BPD from the existing literature, that conceptualised the term BPD as it is commonly known today. These included intense affect (usually depression/hostility), impulsive behaviour, social difficulties, brief psychotic experiences, disorganised or illogical thoughts and unstable relationships that fluctuate between brief and meaningless to intense and dependent. It was these six features which led to BPD being first recognised as a psychiatric diagnosis in DSM-III (American Psychiatric Association, 1960).

### **1.2.2. The Borderline Personality Disorder Diagnosis**

The term 'borderline personality disorder' (BPD) is a diagnostic label used to describe a group of individuals who demonstrate a specific set of problematic personality features, which would be considered to cause them pronounced day to day difficulties. Current Diagnostic manuals (DSM-IV; American Psychiatric Association, 2000) provide diagnostic criteria for 10 personality disorder diagnoses; paranoid, schizoid, schizotypal, antisocial, borderline, histrionic, narcissistic, avoidant, dependent and obsessive-compulsive. These are further categorised into three clusters: cluster A refers to odd/eccentric personality disorders, cluster B refers to dramatic and emotional personality disorders and cluster C refers to fearful/anxious personality disorders.

BPD is categorised as a cluster B personality disorder along with antisocial personality disorder, histrionic personality disorder and narcissistic personality disorder. Anti-social personality disorder is characterised by a disregard for others and violation of their rights; histrionic by excessive emotionality and attention seeking; narcissistic by grandiosity, a need for admiration and a lack of empathy and BPD is characterised by unstable relationships, self-image, affects and impulsivity (American Psychiatric Association, 2000). Research included in this thesis focuses on personality features associated with BPD. How these personality features form the BPD diagnosis will now be considered in further detail.

According to DSM-IV-TR<sup>1</sup>, in order for an individual to receive a diagnosis of BPD there must be evidence of ‘*a pervasive pattern of instability of interpersonal relationships, self-image, and affects, and a marked impulsivity beginning by early adulthood and present in a variety of contexts*’ (American Psychiatric Association, 2000. p 292). This must be evidenced by the presence of at least five out of the nine criteria noted in Table 1. 1

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<sup>1</sup> At the time of data collection for research included in this thesis the DSM in current use was the DSM-IV-TR with the DSM-V in preparation (American Psychiatric Association, 2013). All data regarding the presence of borderline personality traits that are presented in this thesis have been collected using measures based on DSM-IV BPD criteria (American Psychiatric Association, 2000).

Table 1.1. Diagnostic Criteria for BPD According to DSM-IV (American Psychiatric Association, 2000)

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DSM-IV Criteria for a Diagnosis of BPD

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- 1) Frantic efforts to avoid real or imagined abandonment (not including suicidal or self-harm behaviour);
  - 2) A pattern of unstable or intense interpersonal relationships characterized by shifts between idealisation and devaluation;
  - 3) Identity disturbance: marked and persistently unstable sense of self or self-image;
  - 4) Impulsivity in at least two potentially damaging areas (not including suicidal or self-harm behaviour);
  - 5) Recurrent suicidal behaviour, gestures or threats or self-harm behaviour;
  - 6) Affective instability due to marked reactivity of mood;
  - 7) Chronic feelings of emptiness;
  - 8) Inappropriate intense anger or difficulty controlling anger;
  - 9) Transient, stress related paranoid ideation or severe dissociative symptoms.
- 

DSM- IV-TR operates using a categorical system; if five or more criteria are found to be present, persistent, and evident in a range of contexts, including evidence in the last twelve months and five years then the diagnosis is considered to be definite. If four or less criteria are present the diagnosis is absent. However, according to the International Personality Disorder Examination (IPDE; Loranger, 1999), a widely used assessment for personality disorder based on DSM-IV and ICD-10 criteria, if individuals fall just below diagnostic thresholds they may be considered to have a

‘possible’ diagnosis. The categorical system has been found to demonstrate several limitations. Firstly, diagnostic criteria for personality disorders published in the DSM-IV-TR have demonstrated poor discriminant validity. A number of BPD symptoms have been found to demonstrate small-medium significant positive correlations with symptoms from other personality disorder classifications, such as histrionic personality disorder and dependent personality disorder (Blais & Norman, 1997). In line with this, it has been reported that individuals meeting diagnostic criteria for BPD demonstrate high-levels of co-morbidity with other cluster B personality disorders (42-53%) and some cluster A personality disorders (40-50%) (Farmer & Chapman, 2002). Although some co-morbidity with other cluster B personality disorder may be expected, this could be problematic in research to conclude the specificity of findings to Borderline Personality Features (BPF), rather than more general features of personality pathology. Secondly, the current categorical system allows for high levels of heterogeneity within personality disorder diagnoses. Therefore two individuals may receive the same diagnosis whilst not sharing identical borderline symptoms (Johansen, Karterud, Pedersen, Gude, & Falkum, 2004). Thirdly, the DSM-IV-TR adopted ‘an all or nothing approach’ to diagnosis using arbitrary diagnostic thresholds, which fails to acknowledge the possibility that personality pathology may exist on a continuum with healthy personality functioning (e.g. Skodol et al., 2002; Trull, Widiger, & Guthrie, 1990; Widiger & Trull, 2007)

The DSM 5 was published during the writing stage of this thesis. The DSM 5 includes two models of personality disorder diagnosis: the current approach and the alternative approach. The ‘current model’ is consistent with the categorical approach to personality disorder diagnosis outlined in DSM-IV in order to facilitate continuity in clinical practice. However, the DSM 5 ‘alternative model’ provides a more flexible approach to diagnosis with an emphasis on individual pathological traits. This model



requires significant impairments in two or more areas of personality functioning: identity, self-direction, empathy, intimacy (Criterion A), and the presence of pathological personality traits (Criterion B) for any diagnosis of personality disorder to be made. Contrary to DSM-IV where ten personality disorder types were defined, the DSM 5 'alternative model' only includes six specific personality disorder types: antisocial, avoidant, borderline, narcissistic, obsessive compulsive and schizotypal personality disorder. Each specific type of personality disorder is characterised by a specific set of problematic personality traits. An additional diagnosis of 'personality disorder trait specified' is used when impairments in personality functioning are present but the pathological personality traits presented do not correspond to any of the six specified personality disorders. For a diagnosis of BPD to be given using the 'alternative model' individuals must demonstrate significant impairments in two or more areas of personality functioning (Criterion A) and demonstrate at least four of the following pathological personality traits: emotion lability, anxiousness, separation insecurity, depressivity, impulsivity, risk taking and hostility. One of the present pathological personality traits must be impulsivity, risk taking or hostility, highlighting the central position of these features in the diagnosis.

When this research was conducted the diagnostic manual in current use was the DSM-IV-TR. As a result the research included in this thesis is based upon the diagnostic criteria outlined in DSM-IV-TR (American Psychiatric Association, 2000) and is therefore consistent with the current model, rather than the alternative model, for personality disorder diagnosis in DSM 5 (American Psychiatric Association, 2013).

### **1.2.3. Prevalence and Cost of Borderline Personality Disorder (BPD)**

The prevalence of BPD in Great Britain is estimated to be 0.7% (Coid, Yang, Yrer, Roberts, & Ullrich, 2006) and has been reported as being more prevalent in women than in men (Swartz, Blazer, George, Winfield, 1990). In contrast, a recent

large-scale general population study (N=34,653) reported no difference in the prevalence of absolute BPD diagnoses between men and women (Grant, Chou, Goldstein, Huang, Stinson, Saha & Ruan, 2008). Further to this it has been noted that the symptom profile of men and women is also very similar: the only significant difference was increased identity disturbance in women (Johnson et al., 2003). However it was noted that males and females with BPD differed in the presence of co-morbid disorders and levels of mental and physical disability (Johnson et al., 2003). Firstly, males with BPD were more likely than females to receive a co-morbid diagnosis of antisocial personality disorder. Secondly, females reported greater levels of mental and physical disability than males. In line with this it has been reported that men are more likely to demonstrate the BPD criterion of impulsivity, whereas women are more likely to demonstrate affective instability (Aggen, Neale, Røysamb, Reichborn-Kjennerud, & Kendler, 2009). Given the association between trait impulsivity and antisocial behaviour (Miller & Lynam, 2001), it may be that men are more likely to engage in anti-social behaviour increasing the likelihood that men with BPD may be found in forensic services and more women in healthcare settings where prevalence studies are typically conducted. This may lead to a sampling bias in prevalence studies thus explaining inconsistencies in findings.

Alternatively, inconsistencies in the reporting of BPD prevalence across gender may be as a result of bias in diagnosis. Although there is research to the contrary (Henry & Cohen, 1983), it has been reported that clinicians are more likely to give a diagnosis of BPD if the client is believed to be female rather than male, despite the case information being identical (Becker & Lamb, 1994). It is suggested that this may be as a result of higher prevalence rates for BPD being reported for females, thus biasing clinician's perceptions of symptoms and increasing the likelihood of a BPD diagnosis being given to a female. In turn this contributes to prevalence statistics creating a self-

perpetuating cycle. As a result, studies using clinician's assessments of BPD may be more likely to demonstrate a higher prevalence in females than males.

Given evidence that BPD may be equally prevalent in both females *and* males, future research should aim to achieve gender balanced samples. The use of gender balanced research samples would allow findings to be generalised across gender or may highlight differences in factors associated with BPD in males and females, which may identify gender specific targets for intervention. It is for this reason that the research presented in this thesis sought to gain a gender balanced sample to explore any gender specific findings.

Regardless of gender, a diagnosis of BPD is associated with poor long term outcomes for the individual including increased risk of suicide (Pompili, Girardi, Ruberto, & Tatarelli, 2005), impaired functioning in social relations and leisure (Skodol et al., 2002), and poorer quality of life in mental, social and physical domains (Perseus, Andersson, Asberg, & Samuelsson, 2006). Research to aid understanding of factors that contribute to the development and maintenance of BPD is important in order to inform interventions to help improve long term outcomes for this group of individuals. However, it is not only individuals meeting diagnostic criteria for BPD that have been found to experience long term problems. It has been reported that Borderline Personality Features (BPF), which may not meet diagnostic criteria, are not only present in non-clinical populations but they are also associated with poor long term outcomes such as lower academic achievement, increased likelihood of axis-I mood disorders and more interpersonal problems (Trull, Useda, & Conforti, 1997).

#### **1.2.4. Prevalence and Personal Costs of BPF**

It is increasingly being accepted that problematic personality features, such as those associated with BPD, exist on a continuum with healthy personality functioning (Widiger & Trull, 2007). This is supported by research demonstrating that individuals

with increased levels of problematic personality features, which do not meet diagnostic criteria, have similar personality characteristics to individuals who meet criteria for a personality disorder diagnosis (Wilt, Schalet, & Durbin, 2010).

In line with this, research has found high levels of BPF, which may not necessarily meet diagnostic criteria, are present in non-clinical populations, with a prevalence of 15-20% (Gardner, Qualter, & Tremblay, 2010; Trull, 1995). It has been reported that there is no difference in total BPF scores according to gender (Gardner & Qualter, 2009). However, other research has reported differences in the prevalence of specific BPF: men score higher for impulsivity and women score higher for affective instability, abandonment and interpersonal problems (Fonseca-Pedrero et al., 2011). This suggests that men and women who score highly for BPF may have differences in their personality profile. Irrespective of gender the research discussed above demonstrates that high levels of BPF, which may not necessarily meet diagnostic thresholds, are more prevalent than BPD and are associated with poor outcomes for the individual. However, it is not clear from these findings why some individuals appear to develop BPF when others do not. One theory that offers some insight into the factors that may contribute to the development and maintenance of BPF and BPD is Biosocial Theory (Linehan, 1993).

### **1.3. Biosocial Theory**

Biosocial theory has become a seminal theory of the development and maintenance of BPF (Linehan, 1993). This is largely due to the success of dialectical behaviour therapy (DBT); a treatment program for BPD derived from biosocial theory (Carter, Willcox, Lewin, Conrad, & Bendit, 2010; Linehan, Heard, Armstrong, & Suarez, 1993; Linehan, Heard, & Armstrong, 1993; Verheul et al., 2003; Zanarini, 2009). Although DBT has received some criticism for its focus on individual behaviours rather than exploring core higher order processes (Ryle, 1997), the underlying biosocial theory and

subsequent research combines components from a range of theoretical perspectives including biological, cognitive, social and behavioural. As a result Linehan's biosocial theory has been selected as the central theory from which to explore the development of BPF. The key idea behind biosocial theory (and DBT) is that BPF develop and are maintained as a result of emotion dysregulation. Emotion dysregulation refers to a lack of effective emotion regulation: the ability to influence what emotions we have, when we have them and how we experience and express these emotions. It is suggested that emotion dysregulation arises from a combination of biological vulnerabilities and unhelpful social interactions during childhood. This is consistent with other dominant theoretical models in the field such as the development of reciprocal roles within cognitive analytic therapy (Ryle, 1997) and the goodness of fit model (Chess & Thomas, 1996). Both of these models highlight the importance of early interactions between biological and environmental factors in the development of an individual's understanding of self and behaviours in response to their environment. More specifically, biosocial theory suggests that some individuals are born with the tendency to experience rapidly developing, intense and long lasting emotional responses, which increase the need for effective emotion regulation. However, emotion invalidation during childhood, that is ignoring or responding with hostility to a child's emotional responses, prevents learning of effective emotion regulation skills (Linehan, 1993). Therefore an increased need for effective emotion regulation is met with a deficit in emotion regulation skills resulting in emotion dysregulation.

Linehan (1993) proposed that the diagnostic criteria for meeting the threshold of BPD can be broken down into five domains of dysregulation: emotion, interpersonal, self, behavioural and cognitive. Emotion dysregulation is suggested to be the central form of dysregulation in BPD from which all other domains of dysregulation emerge. The central role of emotion dysregulation in the development of BPF is supported by

empirical research indicating that difficulties in emotion regulation is a strong predictor of the presence of BPF (Cheavens, Strunk, & Chriki, 2012). Figure 1.1 illustrates a model of biosocial theory to clarify how each component in the theory may contribute to the development and maintenance of BPF.

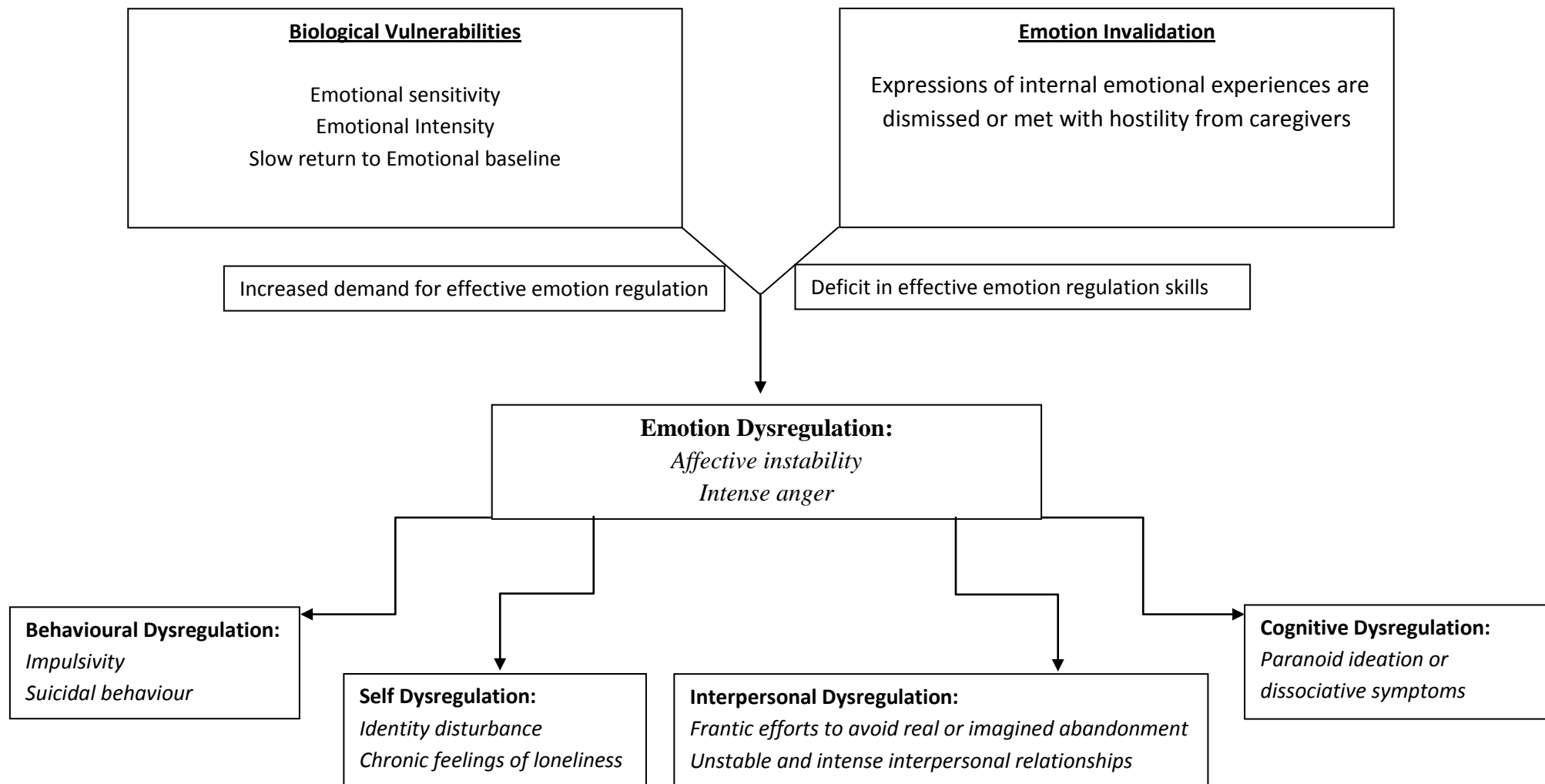


Figure 1.1. Relationship between the Components of Biosocial Theory and DSM-IV Criteria for BPD (shown in italics)

Although biosocial theory was initially derived from clinical observations many components of the theory now have accompanying empirical research. Each component of the theory will be described and the empirical evidence for these components will now be explored.

### **1.3.1. Biological vulnerabilities**

In Linehan's biosocial theory, biological vulnerability is made up of three sub-components: emotional sensitivity (individuals react quickly to small emotional stimuli in the environment), emotional intensity (individual's emotional responses are strong) and a slow return to emotional baseline (once an emotional response is triggered it lasts a long period of time). Each of these will now be discussed in turn.

#### *Emotional sensitivity*

Biosocial theory suggests that individuals with high levels of BPF are likely to have experienced emotional sensitivity from birth which continues into adulthood. Emotional sensitivity refers to the tendency to have a low emotional threshold and react quickly to even mild emotional stimuli, such as disapproval (Linehan, 1993). This means that emotional responses are easily evoked and this increases the likelihood of experiences of negative emotions.

Research has attempted to explore emotional sensitivity by studying facial emotion recognition in relation to the presence of BPF. It was hypothesised that individuals with high levels of BPF are more sensitive to emotional information and this means that they may be hyper vigilant to facial displays of emotion. As a result emotion recognition has been explored extensively in relation to BPF (see Domes, Schulze, & Herpertz, 2009, for a review).



One of the earliest studies to explore this was by Levine, Marziali and Hood (1997). In this study a sample of 30 individuals with a diagnosis of BPD (10 male, 20 female) were compared to age and education matched controls for accuracy in identifying facial expressions of emotion, presented in static images. It was found that individuals in the BPD group were significantly less accurate when identifying facial expressions of anger, fear and disgust compared to healthy controls. Consistent with this Bland, Williams, Scharer and Manning (2004) investigated facial emotion recognition in a female sample and found that individuals with a diagnosis with BPD were less accurate at identifying sad, anger and disgust than healthy controls. Together these findings appear to oppose biosocial theory demonstrating that individuals with a diagnosis of BPD are less sensitive to emotional cues in facial expressions.

In contrast and consistent with biosocial theory, Wagner and Linehan (1999) found that individuals with a diagnosis of BPD (n=21) were more accurate at identifying facial expressions of fear than non BPD individuals with a history of sexual abuse (n=21) or non BPD no sexual abuse controls (n=20). However, the BPD group were found to demonstrate a negativity bias and over report fear across all categories of stimuli, which may have driven increased accuracy in identifying fear by chance (Wagner & Linehan, 1999). Adding further uncertainty to the field Minzenberg, Poole and Vinogradov (2006) found, using a predominantly female sample, that individuals with a diagnosis of BPD did not differ from healthy controls in their accuracy of identifying facial emotion expression for any emotion. Consistent with this, Hagenhoff et al. (2013) investigated the ability of a predominantly female sample (79%) of BPD patients to identify angry and happy faces in a 3x3 or 4x4 matrix of neutral faces, compared to gender and age matched controls. There were no significant differences found in the reaction times to identify the target happy or sad faces within the matrix between the BPD group and control groups. The finding that these groups do not differ

in their ability to search and identify emotional faces is interpreted as an indication that individuals with BPD do not demonstrate sensitivity for emotional stimuli.

However, it has been argued that accuracy in the identification of emotion in static images of facial expressions does not directly measure sensitivity to emotional stimuli. Instead emotional sensitivity research in BPD has adopted a new protocol using dynamic facial expression stimuli, which gradually morph from neutral to the full expression of an emotion. This protocol was developed to more directly assess individuals with high levels of BPF for how sensitive they are toward emotional information in facial expression. If individuals with high levels of BPF are more sensitive, as theory predicts, then they should be able to identify emotions at an earlier stage of expression than individuals with low levels of BPF. Using this approach Lynch et al. (2006) found that a predominantly female community sample with a diagnosis of BPD were able to correctly identify the emotion expressed earlier than healthy controls after controlling for incorrect responses and medication. A medium to large effect size was found for all emotions, though only effects for happiness and anger reached significance (Lynch, Rosenthal, et al. 2006). This suggests that individuals with a diagnosis of BPD are more sensitive to emotional information in specific facial expressions. In contrast, Domes et al. (2008) found that sensitivity toward morphing facial expressions of emotion was comparable in BPD female patients and healthy controls. However, it was found that when facial expressions were ambiguous BPD patients demonstrated a significant bias towards the perception of anger. In addition it was found that emotional sensitivity in the BPD group increased over subsequent trials suggesting that individuals with BPD may demonstrate emotional sensitivity toward familiar stimuli or faces. Alternatively, this may be an indication that individuals with high levels of BPD demonstrate a more rapid learning effect for emotional stimuli.

The contrast in findings between Lynch et al., (2006) and Domes et al., (2008) may be due to subtle differences in experimental design. For example, in the Lynch et al (2006) study participants were able to change their minds on their response whereas in the Domes et al (2003) study only the first response was used. This therefore alters the likelihood of guessing. However, research using the same experimental design as Lynch et al (2006) demonstrated contradictory findings; reporting a decrease in emotional sensitivity to the expression of happiness and anger in female adolescents diagnosed with BPD in comparison to age and gender matched controls (Robin et al., 2012). The inconsistencies in findings between Robin et al (2012) and Lynch et al (2006) cannot be attributed to experimental design as the same design was used in each study. However, there were differences in the participants used. Lynch et al used an all outpatient sample with a mean age of 35 years, whereas Robin et al (2012) used a predominantly inpatient sample (64%) with a mean age of 16 years. Therefore it may be that younger individuals *or* individuals with more severe levels of BPF, which necessitate hospital treatment, demonstrate impairments in the identification of facial expressions of emotion.

Research exploring emotional sensitivity in relation to the presence of extreme levels of BPF has yielded inconsistent findings. In order to integrate these findings a recent study conducted a meta-analysis of results regarding facial negative affect across five studies for specific negative emotions: anger, disgust, fear and sadness. It was reported that there were no significant differences between healthy controls and individuals with a diagnosis of BPD for any of the four emotions (Mitchell, Dickens, & Picchioni, 2014). As such it cannot be confidently concluded that emotional sensitivity contributes to the development and maintenance of BPD as outlined in biosocial theory.

However, the body of research discussed above, along with studies identified below, highlight important issues that require addressing in research. Firstly, the

identification of differences in emotional processing of both positive and negative emotions supports the idea that problems in emotion regulation may be evident in both positive and negative emotion regulation processes (Lynch, Rosenthal, et al., 2006; Mitchell et al., 2014; Robin et al., 2012). Secondly, past research has consistently indicated the presence of a negative appraisal bias in relation to BPF (Domes et al., 2008; Dyck et al., 2009; Mitchell et al., 2014; Wagner & Linehan, 1999). It has been suggested that the tendency to demonstrate increased sensitivity towards negative stimuli may result from a global deficit in regulating attention. In line with this research has explored effortful control (the ability to regulate attention and behaviour in a voluntary manner) as a potential moderator in the relationship between BPD and recognition of facial emotion expression (Gardner, Qualter, Stylianos, & Robinson, 2010). Findings show that for individuals low in effortful control BPF predicted poorer accuracy in anger identification, whilst for individuals high in effortful control BPF predicted better accuracy in anger labelling. Therefore it is possible that levels of effortful control rather than BPF per se are responsible for the inconsistencies in facial emotion recognition literature.

The ability to voluntarily refocus attention has previously been highlighted as one of four key skills required for emotion regulation (Gottman & Katz, 1989), therefore deficits in this area may increase the risk of emotion regulation problems. In line with this research has shown that the presence of emotional sensitivity in individuals with high levels of BPF was moderated by their attentional focus: BPF were only associated with increased emotional reactivity when their attention was focused on threat relevant stimuli (Baskin-Sommers, Vitale, Maccoon, & Newman, 2012). As a result Baskin-Sommers et al (2012) suggest that individuals with high levels of BPF may be predisposed to attend to negative or threatening stimuli and once attending are unable to disengage, which contributes to intense emotional responding.

### *Emotional intensity*

According to biosocial theory individuals with high levels of BPF are biologically predisposed to intense emotional reactions. This means that what might lead to slight frustration in one individual, may lead to uncontrolled anger in an emotionally intense individual; or what may lead to mild pleasure in one individual may trigger overwhelming joy in an emotionally intense individual (Linehan, 1993).

Emotional intensity associated with BPF, including that which reaches a diagnosis of BPD, has been repeatedly investigated using experience sampling methodology, a technique which allows self-report ratings to be made at several time points throughout the day within an individual's natural living environment (Larson & Csikszentmihalyi, 1983). It has been consistently found that individuals with a diagnosis of BPD or with high levels of BPF which fall short of the BPD threshold, demonstrate higher levels of negative affect intensity in comparison to healthy controls (Ebner-Priemer et al., 2007; Russell, Moskowitz, Zuroff, Sookman, & Paris, 2007; Stein, 1996; Stiglmayr et al., 2005; Zeigler-Hill & Abraham, 2006). In addition, elevated emotional intensity in BPD has been well documented in self-report questionnaire based studies (e.g. Levine et al., 1997; Yen, Zlotnick, & Costello, 2002).

Research investigating physiological changes in the brain during the processing of emotional stimuli has also provided support for intense emotional responses in BPD. More specifically research has explored the activation patterns of brain regions such as the amygdala, which has been repeatedly found to be associated with the presence of emotion (Hamann, Ely, Hoffman, & Kilts, 2002). It has been found that individuals with a diagnosis of BPD demonstrate significantly higher levels of amygdala activation in response to aversive emotional stimuli in comparison to healthy controls (Donegan et al., 2003; Herpertz et al., 2001). This has been supported by more recent research that used social emotional stimuli to induce emotion and reported enhanced activation of

neural emotion networks (including the amygdala) in BPD patients (Schulze et al., 2011). In contrast to the preceding findings, research using a combination of self-report and physiological measures, reported no signs of increased emotional intensity in individuals with BPD compared to healthy controls (Herpertz, Kunert, Schwenger, & Sass, 1999). However, it has been suggested that this may have been due to the patient group being under treatment where the use of psychotropic medication may have blunted emotional responses (Sansone & Sansone, 2010).

Together this self-report and physiological research provides strong support for the presence of intense emotional experiences in individuals with a diagnosis of BPD and individuals with high levels of BPF. However, it has been reported that intense affect alone is not sufficient to predict the presence of BPF. Research investigating emotional experiences of individuals with high levels of BPF compared to those individuals with mood disorder, has reported that affect intensity within these two populations is comparable. However, individuals with high levels of BPF (including BPD) demonstrate an overall increase in variance of their positive and negative emotion intensity over time and significantly larger and more rapid changes in negative emotional intensity (Henry et al., 2001; Trull et al., 2008). Therefore it is suggested that it is change in emotion intensity over-time rather than the intensity of an initial emotion response which characterises BPD. This may be an indication that it is how the individual attempts to change the emotional response that differentiates BPD from mood disorders. In line with this it has been reported that it is self-reported emotional control in addition to emotional intensity that predict levels of BPF even after controlling for depression (Yen et al., 2002). Further to this, a number of factors have been found to mediate the relationship between negative affect and the presence of BPF including thought suppression (Cheavens et al., 2005), experiential avoidance (Gratz, Tull, & Gunderson, 2008), rumination (Baer & Sauer, 2011) and distress tolerance

(Bornovalova, Matusiewicz, & Rojas, 2011). Thought suppression, experiential avoidance and rumination are all considered to be strategies of emotion regulation and distress tolerance a key emotion regulation skill. Consistent with biosocial theory this suggests it is how an individual attempts to regulate their emotional experiences, combined with the presence of intense emotional experiences, which may lead to the development of BPD.

*Slow return to emotional baseline*

The final biological vulnerability factor highlighted in biosocial theory is a slow return to emotional baseline. This means that once an emotional response has been initiated it takes a long time to subside. Relative to emotional intensity and sensitivity, less research has been conducted to explore a slow return to emotional baseline in BPD. Jennings (2003) explored this component of biosocial theory by investigating the magnitude and duration of responses to positive, negative and neutral emotional stimuli using the startle response technique. It was found that individuals with a diagnosis of BPD demonstrated a greater magnitude in startle response than healthy controls for all stimuli. However, follow-up measurements between BPD and controls showed no significant difference suggesting that the two populations did not differ in the duration of their emotional response. In contrast, an experience sampling methodology study reported that individuals with a BPD diagnosis demonstrated negative emotional arousal that persisted for a longer period of time than healthy controls (Stiglmayr et al., 2005). Further to this, Jacob et al. (2008) monitored self-reports of anger for three minutes following an anger induction technique and reported that individuals with a diagnosis of BPD were found to demonstrate a significantly prolonged anger response in comparison to healthy controls (Jacob et al., 2008). In line with this, research has reported that individuals with a diagnosis of BPD report higher levels of shame, which remain elevated for a longer period of time than healthy controls. However, this effect

was not found for other emotions explored (hostility, anxiety, irritability), suggesting that this effect may be context and emotion specific, and may occur in response to negative evaluation from others (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2010).

Research exploring the duration of emotional responses in relation to the presence of BPD are limited. There are inconsistencies between Jennings (2003), which indicated no increase in the duration of emotional responses in the BPD groups, and other studies reviewed where the BPD group demonstrated prolonged emotional responses. Exploration of the differences in methodological approaches adopted by the two studies may explain the inconsistencies in findings. In the study by Jennings (2003) physiological responses to emotional stimuli were assessed up to 13 seconds following emotional stimuli. Other studies however utilised self-report methodology, assessing duration in minutes following the onset of the emotional response. This suggests that individuals with BPD may experience a prolonged subjective experience of specific emotions without the accompanying physiological response.

### **1.3.2. Evaluation of the role of biological vulnerabilities in BPF and BPD**

Each of the three components termed ‘biological vulnerabilities’ in Linehan’s biosocial theory have been associated with the presence of BPF, including extreme levels of BPF meeting diagnostic thresholds for BPD. However, there is little evidence to suggest that these vulnerabilities are biologically determined. This is important to know because if the vulnerabilities are biologically determined then they may be more resistant to change. As a result interventions should focus on supporting individuals to regulate these rapid, intense and enduring emotional responses. However, if they are determined by environmental transactions then supporting individuals to change how they interact with the environment in order to prevent this type of emotional response may be more beneficial.



Heritability studies suggest there may be a genetic component in the development of BPD (Bornovalova, Hicks, Iacono, & McGue, 2010). However this does not specifically support the idea of *biological vulnerabilities* as outlined in biosocial theory. In order to achieve this each of these components would have to be investigated for heritability independently. Some recent research has attempted to explore the heritability of emotional intensity and emotional sensitivity in the general population. These studies have reported that 40% of the variance in emotional intensity and 18-64% (depending on the specific emotion) of the variance in sensitivity can be attributed to genetic factors (Coccaro, Ong, Seroczynski, & Bergeman, 2012). Although this indicates that these vulnerabilities may have a biological component, they are not exclusively biologically determined. Consequently it is possible that environmental influences also have a role in the development of these vulnerability factors. Thus it may be that some of the emotional intensity and sensitivity associated with BPD may result from how the individual has learnt to perceive and respond to their environment, factors that may be under the realm of self-control.

A second line of enquiry to provide evidence for biological vulnerabilities of the disorder is the identification of neurological abnormalities. Research has identified both functional (e.g., Donegan et al., 2003; Herpertz et al., 2001.) and structural (e.g. Rüscher et al., 2003; Soloff et al., 2013) brain abnormalities in individuals with a diagnosis of BPD in comparison to healthy controls. Further to this, these abnormalities have been primarily identified in areas associated with emotion and emotion regulation, thus supporting the central role of emotion difficulties within this disorder. However, as these studies are conducted on individuals with a current diagnosis of BPD it is difficult to establish whether the differences in neural activity and structure associated with BPD are cause or consequence of the emotional vulnerabilities outlined in biosocial theory.

Rather than being biologically determined, the emotional cascade model offers a psychological explanation as to how intense and long lasting emotional responses may develop (Selby & Joiner, 2009), which has been supported by empirical research. Central to the emotion cascade model is the use of rumination as an emotion regulation strategy. Rumination involves focusing attention on the causes, consequences and experience of negative affect and has been found to prolong negative emotion (Nolen-Hoeksema, 1991). Despite the poor outcomes associated with rumination many people report using it as an emotion regulation strategy due to the belief that rumination will help them to better understand the situation allowing resolution (Papageorgiu & Wells, 2001). The emotional cascade model suggests that individuals with high levels of BPF engage in high levels of rumination on negative emotion. The use of rumination is suggested to increase emotional intensity thus drawing further attention to the negative emotion, resulting in continued rumination. This cycle may cause intense emotional responses to develop following the smallest of stimuli, explaining high levels of emotional intensity associated with BPF. In addition, as the cycle is self-sustained it is also likely to lead to long lasting emotional responses. This intense and long lasting emotional state may then call for the use of problematic behaviours (e.g., deliberate self-injury, substance abuse, angry outburst) as an emotion regulation strategy to distract oneself and break the cycle (Selby & Joiner, 2009).

The emotion cascade model suggests that rapid intense and long lasting emotional responses may develop from problems in emotion regulation rather than being biologically predetermined. From this viewpoint the intensity and duration of an emotional response, which appear problematic for individuals with high levels of BPF, may be reduced by changing their response to the presence of mild emotional experiences. This highlights the importance of understanding how emotion regulation

is conducted by individuals with high levels of BPF and whether this may explain the development of intense and long lasting emotions.

### **1.3.3. Emotional Invalidation, Emotion Regulation Problems and BPF**

Linehan's biosocial theory suggests that the presence of biological vulnerabilities in emotion, sensitivity, intensity and duration, increases the demand for effective emotion regulation. However the theory also suggests that these individuals have deficits in their ability to regulate their emotions due to invalidating environments during childhood (Linehan, 1993). Emotion regulation skills develop throughout the lifespan, as a result of learning beginning in early childhood. Children as young as three years old have been found to demonstrate an understanding that an individual can act to alter their emotional responses and this understanding predicts behaviour in frustrating tasks (Cole, Dennis, Smith-Simon, & Cohen, 2009). In addition, parental support during times of distress was predictive of the infant's knowledge of strategies (Cole et al., 2009). In line with this, biosocial theory suggests that for individuals with high levels of BPF the presence of emotional invalidation during childhood may have prevented learning of emotion regulation skills (Linehan, 1993). Emotional invalidation refers to the tendency for expressions of internal emotional experiences to be dismissed or met with hostility from caregivers. For example, a frightened child may cry to gain support from the caregiver; if the caregiver disregards this expression by telling the child to 'stop crying like a baby' the child may learn that their experience is wrong and must not be expressed. Yet extreme emotional behaviours from the child may still be responded to with support. This leads the individual to believe that the emotional experience is to be ignored, preventing the individual from learning how to experience, label, express and regulate emotions. However, when the emotional experience cannot be ignored extreme emotional behaviour may be a useful strategy to gain support from the environment.

The role of emotional invalidation and emotion regulation difficulties in the development of BPF is supported by empirical research indicating that self-reported emotional invalidation during childhood significantly predicts the presence of BPF and emotion regulation difficulties in adulthood (Hong, Ilardi, & Lishner, 2011; Reeves, 2007). Further to this it has been reported that emotional avoidance (an emotion regulation strategy) mediates the relationship between childhood emotional invalidation and adult psychological distress (Krause, Mendelson, & Lynch, 2003). Consistent with biosocial theory, this indicates that emotional invalidation in childhood interferes with the development of emotion regulation skills resulting in unhelpful strategies such as emotional avoidance, which can then cause long term psychological problems in adulthood such as experiences of depression and anxiety (Krause et al., 2003).

Together these three studies (Hong et al., 2011; Krause et al., 2003; Reeves, 2007) support biosocial theory by demonstrating that emotional invalidation during childhood may lead to unhelpful emotion regulation attempts and contribute to BPF in adulthood. In addition research has shown that problems in emotion regulation may have a key role in the development and maintenance of BPF (Cheavens et al., 2012). Despite this, little is known about how this group of individuals attempt to regulate their emotions, what difficulties are associated with emotion regulation attempts and if it differs from individuals with low levels of BPF.

Emotion regulation can be defined as the ability to alter what emotions we have, when we have them and how we experience and express these emotions (Gross, 1998b). Further to this, the processes that alter emotion may occur explicitly, requiring voluntary action and conscious monitoring, or implicitly, occurring in an automatic manner without the individuals conscious awareness (Gross, 1998b; Mauss, Cook, & Gross, 2007). In line with this definition biosocial theory suggests that individuals with high levels of BPF may be unable to control stimuli that may lead to the onset of an

emotional response as well as experiencing difficulty in regulating their emotional response once generated (Linehan, 1993). Research has highlighted four major components in emotion regulation: awareness and understanding of emotions, acceptance of emotions, control of impulsive behaviours/behaviour consistent with desired goals in the presence of negative emotion, and the use of situational appropriate emotion regulation strategies effectively (Gratz & Roemer, 2004).

Glenn and Klonsky (2009) explored the link between each of these components and the presence of BPF in a non-clinical population after controlling for anxiety, depression and negative affect intensity. It was found that impulse control difficulties and a lack of access to emotion regulation strategies were the strongest predictors of BPF. This is consistent with recent findings in clinical samples reporting that impulsivity and a lack of access to emotion regulation strategy scores were higher in individuals with a diagnosis of BPD compared to Bipolar disorder (Fletcher, Parker, Bayes, Paterson, & McClure, 2014). Similarly, Salsman and Linehan (2012) reported that a lack of emotional clarity and limited access to emotion regulation strategies predict the presence of BPF after controlling for affect intensity and suggest that limited access to emotion regulation strategies may be caused by limited knowledge of helpful emotion regulation strategies.

Past research has suggested that individuals with high levels of BPF or a diagnosis of BPD may demonstrate insufficient knowledge of helpful emotion regulation strategies. Gardner and Qualter (2009b) investigated emotional intelligence in relation to BPF in a non-clinical sample and found that emotion management, which represents knowledge of emotion regulation strategies, is negatively associated with BPF. Although effect sizes were modest, this indicates that individuals with high levels of BPF may have poorer knowledge of emotion regulation strategies. Further to this, it has been reported that individuals with a diagnosis of BPD tend to use more unhelpful

emotion regulation strategies. Conklin, Bradley, and Westen (2006) explored how emotion regulation attempts made by individuals with a diagnosis of BPD compared to those with dysphoric disorder: a disorder characterised by persistent low mood. This was achieved using ratings of experienced clinicians. It was reported that patients with BPD demonstrate significantly greater use of unhelpful emotion regulation strategies such as: externalizing strategies (e.g. blaming others), internalizing strategies (e.g. blaming self), emotional avoidance (e.g. thinking about the situation without feeling the corresponding emotion) and disorganized strategies (e.g. self-injury or risky behaviour) and significantly lower for reality focused coping (e.g. responding flexibly to emotional situations). However, this study poses several limitations that may impact on the validity of findings. Firstly, data were gathered via the ratings of experienced clinicians who were not blind to the diagnosis of the participant. This may have led to bias in ratings provided. Secondly, this study focused primarily on the use of adverse emotion regulation strategies: four out of the five strategies rated were considered to be unhelpful. This may restrict the detection of helpful strategies also used in this population. It may be that individuals in this population also use a range of helpful emotion regulation strategies. If this is the case these strategies could be used as a starting point to build from in therapeutic intervention. Despite the limitations with this study, its findings are consistent with other research in this area reporting the use of unhelpful strategies in this population. For example, it has been reported that individuals with BPD use deliberate self-injury to distract themselves from intense negative emotion (e.g. Brown, Comtois, & Linehan, 2002).

Another unhelpful strategy, rumination, has been suggested to mediate the relationship between intense negative emotion and behavioural dysregulation associated with BPD (e.g. aggressive outbursts) in the emotion cascade model (Selby & Joiner, 2009). This has been investigated using experience sampling methodology to examine

the roles of negative affect and rumination in emotion dysregulation. A three way interaction was found indicating that a combination of high BPF scores, intense negative emotion and rumination were required to predict the occurrence of dysregulated behaviours (Selby & Joiner, 2013). Consistent with this, anger and depressive rumination have been reported to predict BPF (Baer & Sauer, 2011). This association was stronger for anger than depressive rumination. Also rumination was found to explain variance in the presence of BPF beyond that accounted for by negative affect, suggesting that negative affect and ruminative thinking influence BPF severity (Baer & Sauer, 2011). This research indicates that individuals with high levels of BPF use the unhelpful emotion regulation strategy of rumination to manage their emotions.

In addition to rumination other unhelpful emotion regulation strategies have also been associated with the presence of BPF. Firstly, the suppression of negative thoughts has been found to mediate the relationship between negative emotion and BPF (Rosenthal, Cheavens, Lejuez, & Lynch, 2005) suggesting that it is attempts to suppress negative thoughts surrounding negative emotion that predicts BPD rather than the presence of negative emotion alone. Further to this, past research has reported that in some cases attempts to suppress negative thoughts can have a rebound effect, increasing the frequency of the unwanted thought (Abramowitz, Tolin, & Street, 2001). This may in turn contribute to rumination. It has also been reported in recent research that the use of suppression in this population is not restricted to negative emotion regulation. Instead it has been found that individuals with a diagnosis of BPD use more suppression for the regulation of both positive and negative emotions compared to healthy controls (Beblo et al., 2013). It is theorised that this tendency to suppress positive and negative feelings may result from a fear of intense emotional states (Beblo et al., 2012). Yet to date suppression has only been associated with fear of intense emotions in depressed and healthy control samples and has not been explicitly identified in individuals with

high levels of BPF or BPD. Therefore the reason for emotion suppression in BPD can only be speculated.

Secondly experiential avoidance, unwillingness to remain in contact with uncomfortable thoughts, emotions, sensations, memories and urges, has been reported a significant predictor of BPF after controlling for depression (Iverson, Follette, Pistorello, & Fruzzetti, 2012). It should be noted that the definition of experiential avoidance outlined by Iverson et al (2012) is comparable to that of emotional avoidance outline by Conklin et al (2006), which was also found to be associated with the presence of BPF. Consistent with this, low distress tolerance previously associated with the presence of BPD (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006) may mean that individuals are less willing or able to withstand intense negative emotion leading to the use of extreme behaviours for immediate distraction.

Taken together this research suggests that individuals with high levels of BPF or BPD may have limited knowledge of helpful emotion regulation strategies. Instead this research suggests that these individuals rely on a small number of unhelpful strategies and problematic behaviours in an attempt to escape unwanted emotion.

In contrast, Beblo et al. (2010) reported that individuals with high levels of BPF were comparable to healthy controls in their ability to select helpful strategies flexibly according to the multiple situations presented in vignettes. This suggests that individuals with high levels of BPF have sufficient *knowledge* of emotion regulation strategies. Further to this, in research studies where participants were instructed to employ specific emotion regulation strategies over a set period of time, it was found that they were able to successfully influence both positive and negative emotions using a range of strategies, such as the use of self-soothing memories and suppression (Chapman, Rosenthal, & Leung, 2009; Jacob et al., 2011). Together these three studies indicate that individuals with high levels of BPF demonstrate sufficient knowledge of



helpful emotion regulation strategies and are able to use these strategies effectively in laboratory and real life settings when instructed to do so. Despite this, individuals with high levels of BPF have been found to use high levels of unhelpful emotion regulation strategies.

A possible explanation for this is that these individuals experience low self-efficacy in emotion regulation, which has been theoretically argued to lead to a reduction in effort and duration of emotion regulation attempts (Bandura, 1977). Self-efficacy in emotion regulation refers to the belief that one can successfully carry out behaviours, or emotion regulation strategies, required producing the desired emotional outcomes. Learning theory suggests once one has acquired the knowledge that a particular behaviour is associated with a favourable outcome, this knowledge will drive initiation of the behaviour in order to obtain the outcome in the future. However, self-efficacy theory argues that this is only the case if the individual believes in their ability to implement the behaviour effectively. If the individual has doubts in their ability to do this, in other words demonstrates low self-efficacy in the situation, they are less likely put themselves in a situation where the behaviour is required, less likely to initiate the behaviour and more likely to give up in the face of obstacles (Bandura, 1977). Therefore if individuals with BPF demonstrate low emotion regulation self-efficacy they may avoid situations that are likely to cause unwanted emotions, be less likely to initiate helpful emotion regulation strategies despite knowledge of their benefits and if strategies are initiated they would be more likely to give up if the unwanted emotion continues. Thus low emotion regulation self-efficacy could be responsible for a range of emotion regulation problems.

Potential evidence for low emotion regulation self-efficacy in individuals with high levels of BPF can be found in past research. When exploring emotion regulation problems using the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004),

both Salsman and Linehan (2012) and Glenn and Klonsky (2009) found that the subscale ‘limited access to emotion regulation strategies’ significantly predicted BPF. It was argued by the authors that this may be representative of a lack of knowledge of effective emotion regulation strategies leading to the use of ineffective and problematic strategies. However, on closer inspection this subscale includes items such as ‘when I am upset I believe that wallowing in it is all I can do’ and ‘when I am upset, I believe that I will remain this way for a long time’ and could equally be taken to represent a lack of self-efficacy in emotion regulation. Further to this a lack of the positive cognition e.g., ‘I am in good control of the things around me’, has been found to be a discriminative feature of individuals with a diagnosis of borderline personality disorder from individuals with other personality disorders (Reed & Zanarini, 2011). This could also be taken as an indication of low positive emotion regulation self-efficacy. Therefore, it may be that these individuals have sufficient knowledge of helpful emotion regulation strategies and ability to use them but low self-efficacy for positive and negative emotion regulation may prevent these individuals from implementing helpful strategies in real life situations.

#### **1.3.4. Limitations of the current literature on Emotion Regulation and BPF**

Although research exploring emotion regulation in relation to BPF has expanded in recent years, there are still several important areas that would be worthy of further attention. Firstly, research within high BPF populations to date has focused heavily on the use of individual unhelpful emotion regulation strategies without exploring the range of strategies used or the use of helpful strategies. Studies that have begun to explore the use of helpful emotion regulation strategies have used experimental protocols in laboratory settings. As a result, it is not clear if helpful strategies would be utilised by this population in real life situations. Further research is required to explore

how individuals with high levels of BPF attempt to regulate their emotions, considering helpful as well as unhelpful strategies, in real life situations.

Secondly, in the field of borderline personality research there has been a predominant focus on the experience and regulation of *negative* emotions. However, there is evidence to suggest that the role of *positive* emotionality may be important for psychological wellbeing. For example, it has been found that positive affect predicts broad-minded coping (taking a broad perspective of problems and generating multiple solutions for them) and broad minded coping predicts future positive affect. Furthermore, this cycle appears to be independent of negative affect (Fredrickson & Joiner, 2002). Therefore, improving positive emotion regulation may be an important target for intervention to improve the emotional wellbeing of individuals with high levels of BPF. For this to be achieved research is needed to explore how individuals with high and low levels of BPF differ in their approach to positive emotion regulation. This may help to identify potentially problematic areas of positive emotion regulation for individuals with high levels of BPF that may be targeted in therapeutic interventions.

Despite suggestions that positive affect can be generated independently of negative affect (Fredrickson & Joiner, 2002), it has been found that the use of some strategies for the regulation of negative emotion may dampen positive emotions (Jacob, Ower, & Buchholz, 2013). An example of such a strategy is experiential avoidance. Experiential avoidance involves attempts to avoid or escape unpleasant thoughts, emotions or memories (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996) and has been previously associated with BPF (Gratz et al., 2008; Iverson et al., 2012). Further to this it has been reported that not only is experiential avoidance associated with BPF and negative emotion, it also predicts a decrease in positive affect (Jacob, Ower, & Buchholz, 2013). Therefore how an individual attempts to regulate their negative

emotions may also have an impact on the experiences of positive emotions, highlighting the need to consider both positive and negative emotion regulation attempts.

Few studies have specifically investigated the experiences or regulation of positive emotions within high BPF populations. Studies that have explored positive emotion experience report that individuals with high levels of BPF experience low and unstable levels of positive emotion (Ebner-Priemer et al., 2007; Zeigler-Hill & Abraham, 2006). Further to this, recent research has compared individuals with a diagnosis of borderline personality disorder to individuals with other personality disorder diagnoses. It was reported that individuals with a diagnosis of BPD demonstrate significantly lower scores of global positive emotion and cognitions (Reed & Zanarini, 2011). In addition a longitudinal study over a 10 year period revealed that patients who reach recovery over this period reported significantly greater positive emotion and cognitions than those that did not reach recovery (Reed, Fitzmaurice, & Zanarini, 2012). This suggests that increasing positive emotion and cognitions may be an important part of the recovery process in borderline personality disorder. This highlights the importance of gaining a better understand of factors that may influence positive emotion regulation in this population.

#### **1.4. Summary**

Borderline personality disorder is a psychiatric diagnosis involving instability of emotions, interpersonal relationships, identity and high levels of impulsivity (American Psychiatric Association, 2000). It is increasingly being accepted that BPF exists on a continuum with healthy personality functioning; this means that BPF which may not meet diagnostic thresholds are also present to a varying degree in non-clinical populations (Trull, 1995) and cause difficulties. For example, non-clinical BPF in a student sample have been associated with long term problematic outcomes such as academic difficulties, interpersonal problems and an increased risk of mood disorder

(Trull et al., 1997). Research exploring the factors underlying non-clinical levels of BPF is important to improve understanding of factors that influence the development of these personality features.

Biosocial theory is a seminal theory of the development and maintenance of BPF. This theory suggests that BPF are secondary to primary problems in emotion regulation (Linehan, 1993). The current literature highlights several factors which may impede emotion regulation success for individuals with high levels of BPF. Firstly there is a wealth of research to suggest that individuals with high levels of BPF use unhelpful strategies to regulate their negative emotions. However, it is not yet clear whether these individuals have knowledge of or use helpful emotion regulation strategies. In addition there is a gap in the literature regarding strategy use for positive emotion regulation in relation to BPF. Secondly, it has consistently been reported in the theoretical and empirical literature that individuals with high levels of BPF demonstrate a negative attention bias and experience difficulty disengaging from negative stimuli. This is likely to contribute to the use of unhelpful strategies such as rumination and subsequent negative emotions. Finally, based on past research findings it is suggested that individuals with high levels of BPF may demonstrate low self-efficacy surrounding positive and negative emotion regulation which may prevent emotion regulation attempts from being initiated or reduce the duration of emotion regulation attempts. In addition, it has been highlighted that problems in emotional functioning associated with BPF may be evident in both positive and negative emotionality. Yet to date research has not explored motivation for emotion regulation or the likelihood of active emotion regulation attempts being made in relation to BPF.

In order to fully understand each of these factors and their potential contribution towards emotion regulation success, they must first be considered in the boarder context of the emotion regulation literature. This is examined in the next chapter where the

emotion regulation literature will be used to explore the potential impact of these factors on emotion regulation success as well as identifying additional factors that may contribute to emotion regulation problems associated with BPF.

## **Chapter 2 – Emotion and Emotion regulation**

### **2.1. Overview**

In order to provide a meaningful discussion of emotion, emotion regulation and how these constructs may relate to the presence BPF, it is first essential to clarify what these terms mean. The theoretical perspective on what an emotion is and how it is generated, has an impact on how emotion regulation is argued to take place. It is therefore essential to be clear on the theoretical perspective adopted and the assumptions this perspective holds for emotion regulation. In order to achieve this, theoretical perspectives of emotion are explored and evaluated. An appraisals perspective of emotion was selected to work from when investigating emotion regulation. This is because appraisals theories explain how individual differences can exist in emotion generation and regulation, facilitates the understanding of emotional experiences associated with BPF and are supported by empirical research. The process model of emotion regulation, which is essentially an appraisals model, was selected as a framework to explore the empirical literature on emotion regulation. This led to the identification of several factors that have been found to influence emotion regulation success. Finally, findings from the emotion regulation literature and literature on BPF (reviewed in chapter 1) are integrated to identify factors which may underlie the emotion regulation problems associated with BPF.

### **2.2. Theories of Emotion**

#### **2.2.1. James-Lange Theory of Emotion**

The first scientific theory of emotion was proposed by William James (1884). A similar theory of emotion was also independently developed by Carl George Lange. As a result the proposed theory was considered to be shared (Lange, 1922) and as a result it is typically referred to as the James-Lange theory of emotion (Lang, 1994). Prior to

the introduction of the James-Lange theory of emotion, philosophers had focused on purely descriptive accounts of the different types of emotion. The James-Lange theory went beyond this offering a deeper insight into how emotions are generated.

According to the James-Lange theory, emotion is generated in two main stages. Firstly, a salient physical or mental object is perceived in situ, which triggers behavioural and physiological bodily responses. Secondly, it is the perception of these bodily responses that results in the subjective experience of emotion. Therefore, without the bodily responses no emotion is present: only an intellectual perception. This is depicted in figure 2.1.

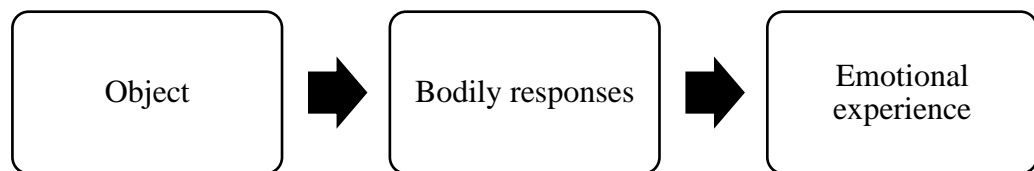


Figure 2.1. A Simple Model of the James-Lange Theory of Emotion

The central and causal role of bodily responses outlined in the James-Lange theory led to the theory being heavily criticised (Palencik, 2007). First, it has been argued that the theory fails to account for why two individuals may demonstrate different emotional responses to the same object/situation. Second, the theory fails to explain how the same physiological change can be associated with more than one emotional experience e.g. an increase in heart rate may indicate excitement or anger. Third, research has indicated that the perceptions of bodily changes have little impact on the experience of emotions (Heilman & Gilmore, 1998). These criticisms suggest that the James-Lange theory is not detailed enough to account for all of the possible variations of emotion or individual differences in emotional responses. As a result, this model fails to facilitate understanding of why individuals with high levels of BPF experience more extreme negative emotional responses or why they experience more



difficulty in regulation of emotions. However, these criticisms are largely based on the latter proposition of the James-Lange theory: that it is the perception of bodily experiences that *is* the emotion. The first proposition suggested that it was the perception of an object in situ, which led to a physiological and behavioural response. The idea that it is our judgements or appraisals about a situation that may trigger an emotional response has been taken forward in more contemporary *appraisal* theories of emotion.

### **2.2.2. Appraisal theories of emotion**

Appraisal theories differ from the earlier James-Lange theory in several important ways. Firstly, in addition to situation, perception (appraisal) and response, which are components previously identified as being crucial to the generation of emotion, appraisal theories introduced a new component: motivation. The inclusion of motivation helps to explain why different people may experience different emotional responses to the same situation. Secondly, appraisal theories consider the term emotion to refer to a process rather than a state. This process is said to be made up of multiple components including appraisals, motivation, and behavioural, physiological and experiential responses, which interact and influence each other in a recursive pattern. Finally, it is suggested that it is the interaction between all of these components that leads to feelings of emotion, not the perception of physiological changes in isolation. The literature on appraisals theory will be explored under two theoretically meaningful constructs: the *type of appraisals* and the *appraisals process*. The type of appraisals refers to what aspects of a stimulus or situation are evaluated and the appraisals process explores how these evaluations lead to an emotional episode.

### *Types of appraisals*

The first appraisal theory of emotion was proposed by Arnold (1960). The basis of Arnold's (1960) appraisals theory of emotion was that in order for an emotion to be present there must first be a situation, which the individual attends to and makes an appraisal about based on the individual's values and goals. This in turn leads to the development of physiological, behavioural and experiential emotional responses. In this theory it was suggested that there are three main types of appraisal: whether critical objects are present, whether the situation proposes benefit or harm to the individual, and the difficulty in attaining or avoiding these objects e.g., for fear, the situation would propose harm, the object would be present and difficult to avoid. However, this theory was heavily criticised for being too simplistic, arguing that the basic appraisals stated were unable to account for all of the variations in emotion type, intensity and duration Moors, Ellsworth, Scherer, & Frijda (2013) . Thus this theory is unable to explain why individuals with high levels of BPF experience more intense and longer lasting emotional responses.

Since Arnold (1960), several other appraisal theories have been proposed introducing more comprehensive sets of appraisals in order to explain a greater variety of emotions and emotional experiences. The cognitive-motivational behavioural theory of emotion (Lazarus, 1991) has been selected as a seminal theory to use as a base for exploring the types of appraisals outlined across appraisals theories. This theory was selected as the types of appraisals it identifies are consistent across the majority of other appraisal theories (see Moors, Ellsworth, Scherer, & Frijda (2013), for review). Therefore the appraisals proposed by Lazarus (1991) are described first, followed by a discussion of additional appraisals proposed in subsequent appraisals theories.

The cognitive-motivational behavioural theory of emotion (Lazarus, 1991) further develops the central ideas of appraisals theory (Arnold, 1960) and addresses past criticism by proposing a more comprehensive set of appraisals to explain many different variations of emotion e.g. anger, anxiety, fear, pride. This more comprehensive set of appraisals has been broadly grouped into primary appraisals and secondary appraisals.

According to Lazarus (1991), primary appraisals are based on the presence of personal goals; a desired result or outcome that is of importance to the individual. Three primary appraisals are proposed. Firstly, *goal relevance*, this refers to whether or not the individual has a goal at stake in the situation. The outcome of this appraisal determines whether an emotional response is generated or not: if no goal is at stake no emotional response is generated. Secondly, *goal congruence*, this refers to whether the situation is likely to be beneficial or harmful to the attainment of a goal and determines whether the emotional response will be positive or negative. Finally, *goal content*, this refers to what type of goal is at stake and determines the type of emotion generated e.g. anger, shame, guilt, pride.

Secondary appraisals, as outlined by Lazarus (1991), are said to be focused on the options and prospects for coping within the situation. Three secondary appraisals are proposed. Firstly, whether *blame or credit* is present in the situation and whether blame or credit is attributable to the self or others (often referred to as agency or cause in other appraisals theories. For example, Roseman, 2013; Scherer, 2013; Scherer, 2009). In order to achieve this, the individual must establish who is responsible for the harm or benefit and what control they had over the situation. It is theorised that the identification of causation within the situation helps to establish the type of emotion generated, for example, if somebody else is to blame the emotion may be anger, if the self is to blame the emotion may be guilt. Secondly, the *potential for coping within the*

*situation*, if one is able to deal with the situation or if the situation can be altered for the better. This appraisal is consistent with other appraisals theories although elsewhere it may be referred to as perceived control or power over the situation (e.g. Roseman, 2013; Scherer, 2013). Finally, what future expectations are likely to result from the event: are things likely to end favourably or not? Again this appraisal is identified in other appraisals theories although has also been referred to as implications in other appraisals theories (e.g. Scherer, 2013).

Although the types of appraisals outlined by Lazarus (1991) are consistent with those outlined in the majority of other appraisals theories, other theories have suggested additional appraisals omitted by Lazarus (1991). One such example would be the novelty or unexpectedness of an emotional stimulus (Ellsworth, 2013; Roseman, Spindel, & Jose, 1990; Scherer, 2013). The novelty or unexpectedness of an emotional stimulus is theorised to be involved in orienting attention towards the stimulus. This orientation of attention is considered essential for further processing of the stimulus and subsequent development of an emotion. Furthermore, it is acknowledged that this appraisal only requires low level processing and often occurs implicitly, outside of conscious awareness (Frijda, 2013; Scherer, 2013).

A final appraisal which is absent from Lazarus (1991) is *internal pleasantness*. This refers to evaluations of the situation as internally pleasant or unpleasant independently of its relevance to personal goals (Frijda, 2009; Scherer, 2013). For example, sitting an exam may be congruent with the goal of career progression and therefore should trigger a positive emotional response. However, the experience of sitting an exam may be appraised as unpleasant thus altering the resulting emotional experience. This highlights the importance of hedonic evaluations in the shaping of emotion as it is theorised to contribute to the overall perceived relevance of the situation

(Scherer, 2013). In addition this example demonstrates that appraisals of a situation may not necessarily lead to a single emotion. Instead it may be that one individual generates several conflicting emotions at the same time and in response to one situation (Mesquita & Frijda, 2011). It is suggested that in this situation each emotional response competes for dominance in power and intensity, which is determined by the importance of appraisal variables. For example, is it deemed more important to pass the exam leading to career progression, or to obtain current pleasant experiences? It is theorised that this process occurs automatically, outside of conscious awareness and as such is an early form of emotion regulation that occurs implicitly as part of the emotion generation process (Mesquita & Frijda, 2011). Research exploring implicit emotion regulation processes is explored in further detail later in this chapter.

A final type of appraisal missing from Lazarus (1991) is the appraisal of *norm/self-compatibility*: the consistency between the current event and social expectations or the individual's representation of the ideal self (Scherer, 2013; Scherer, 2009). This appraisal is theorised to come last in a sequence of appraisals as it requires high level processing of the event in relation to past knowledge. This appraisal is of particular importance within the current thesis due to its relevance to biosocial theory of BPD (Linehan, 1993). An invalidating environment, as outlined in biosocial theory (Linehan, 1993), teaches the individual that negative emotional responses are not socially acceptable. As a result, the early stages of a negative emotional response may be appraised as inconsistent with social expectations and lead to further activation of the emotion response components. This in turn may contribute to the high emotion intensity reported in this population.

Although there is much consistency across appraisals theories in the type of appraisals, there is often debate regarding the conceptualisation of appraisal outcomes

as categorical or dimensional. Lazarus (1991) implies discrete categorical outcomes from appraisals. For example the situation is appraised as congruent or incongruent to the goal. Such an approach only explains the generation pathway for a limited number of emotions. In other theories appraisal outcomes are viewed as more dimensional with a range of outcomes (e.g. Ellsworth, 2013; Scherer, 2009, 2013; Frijda, 2009). It is suggested that there are infinite combinations of emotional responses across all emotion components (e.g. appraisals, physiology, behaviour, and feeling). On balance it is considered that the latter, dimensional, conceptualisation of appraisal outcomes is more probable as this would explain the generation of a wide range of subtly different emotions that individuals may experience on a day-to-day basis (Ellsworth, 2014).

### *The Appraisals Process*

It has been suggested that in the generation of an emotional response appraisals are made in a sequential order: appraisals regarding novelty, pleasantness, goal conduciveness, coping, self/norm compatibility (Scherer, 2013). In support of this, research has found that individuals are able to identify emotions in written scenarios significantly faster when information is presented in this order, providing preliminary indirect support for the sequential nature of emotions (Scherer, 1999). However, further research testing the sequence of appraisals more directly is required. Nevertheless, it is theorised that as the sequence progresses and more appraisals are made, the outcome of each appraisal triggers changes in physiology, behavioural urges, and subjective feelings. As such the intensity of emotional responses increases until eventually the pattern of responding across all emotion components can be identified as a specific emotion e.g. anger, sadness etc. The experience of this emotion will continue until there is a substantial change in appraisals leading to de-synchronisation of the response pattern or forming of a new emotional response pattern (Scherer, 2013). This may occur

by changes in the situation, how the situation occurs or by attempts to directly change any component of the emotion response (e.g. heart rate, breathing, behaviour, thoughts) (Lazarus, 1991; Scherer, 2013). Here appraisals theories begin to indicate how emotion regulation may occur and are consistent with models of emotion regulation such as Gross's (1998) process model of emotion regulation, discussed later in this chapter.

### **2.2.3. Empirical Support for appraisals theories of emotion**

Empirical research has provided support for the central role of appraisals in the generation of emotion by highlighting the role of specific appraisals in shaping the emotional experience. Roseman et al., (1996) explored this by asking a sample of 182 university students to recall two emotional experiences. For each experience participants were requested to describe the situation, what in the situation caused them to feel that specific emotion, and to rate to what extent they made a number of hypothetical appraisals. It was found that several appraisals were associated with emotional experiences in different ways. First, consistent with Lazarus (1991) it was found that appraisals of motive consistency; that is whether or not the situation was consistent with one's own goals predicted whether the emotion generated would be positive or negative. For example, if the situation was perceived as being likely to help the individual obtain their goals, positive emotions were generated. If the situation was perceived to threaten the obtainment of their goals, negative emotions were generated.

Second, the probability of the situation outcome was found to influence qualitative content of emotions. For example, uncertainty was associated with hope and fear, whereas certainty was associated with sadness, distress, relief and joy. Third, it was perceived potential to control/change the situation rather than perceived ability to deal with the outcome that differentiated emotion experiences. For example, reports that the individual had control over the event they had described were associated with anger

and frustration and low perceived control with sadness. This only partially provides support for the secondary appraisal outlined by Lazarus (1991) as the potential to cope which included perceived ability to deal with the situation and to change the situation for the better. Finally, and in line with Lazarus (1991), appraisals of self-cause were associated with pride, regret, guilt and shame and appraisals of others as the cause was associated with affection, dislike, anger and contempt.

Overall, Roseman et al. (1996) have provided some evidence for the role of specific appraisals in the shaping of emotional experiences. However, each appraisal investigated was associated with a range of emotions. Therefore it is not clear from these findings whether appraisals are sufficient to determine specific emotional outcomes. In order to explore this further research would need to look at patterns of appraisals in relation to emotional experience to identify if each emotion demonstrates a unique pattern of appraisals. Further to this each participant described a different situation; therefore it is not clear whether it was differences in the appraisals or the situations themselves which led to differential emotional responses. Therefore the research by Roseman et al. (1996) does not sufficiently explore the fundamental assumption of appraisal theories in that the same situation may evoke different emotional responses dependent on how it is appraised.

Siemer, Mauss and Gross (2007) further explore this assumption by assessing a predominantly female sample of 122 students on the presence of six emotions and four key appraisals from the theoretical literature, following a standardized laboratory stressor. As such, each participant was reporting their emotions and appraisals in relation to the same situation. The stressor involved participants attempting to complete a difficult task whilst repeatedly being provided with negative feedback from the experimenter. Following the task participants provided self-report ratings on emotions



and appraisals. The emotions assessed were anger, shame, guilt, sadness, amusement and pleasure. The appraisals assessed were controllability, importance of situation/event to self, unexpectedness and attribution of responsibility to self or others. It was found that no two emotions demonstrated an identical pattern of significant correlations across appraisals, suggesting that individual emotions are associated with distinct patterns of appraisals. Further to this the pattern of appraisals reported for each individual was found to significantly predict their emotional response. This indicates that the appraisals an individual makes are likely to have a significant impact on type and intensity of the emotional response. On the whole the relationships between appraisals and emotions were consistent with those speculated by appraisals theorists (e.g. Lazarus, 1991; Scherer, 2013; Roseman, 2013). However there were also discrepancies with past theory. For example, according to Lazarus (1991) the situation has to be relevant to the individual's goals in order for an emotional response to develop. However, Siemer et al. (2007) reported that the appraisals regarding the importance of the situation for an individual were not predictors for some emotions, such as sadness and amusement. This suggests that personal importance may be relevant in the generation of some, but not all emotions. This inconsistency between theory and empirical findings may be explained by more recent conceptualization of relevance appraisals. Scherer (2013) suggests that the relevance of a situation or event is made up of three components: novelty, intrinsic pleasantness and pertinence of the event for the current values and goals of the appraiser. The latter of these components perhaps maps closely onto appraisals of 'importance for self' as assessed in the current research (Siemer et al., 2007). However, this study did not assess appraisals of intrinsic pleasantness, therefore it may be the case that emotions which were not predicted by importance for self or unexpectedness, were still highly relevant to the individual based on appraisals of intrinsic pleasantness.

More recently, research has expanded to explore relationships between appraisals, emotions experienced and emotion regulation strategies in a real life situation: during exam preparation (Schmidt, Tinti, Levine, & Testa, 2010). Three weeks prior to an exam a predominantly female sample of 610 students were asked to complete self-report measurements on appraisals, emotions and emotion regulation strategies. It was found all emotions were associated with the appraisal that the exam was important to them. This supports the primary appraisal of goal relevance outlined by Lazarus (1991). The experience of anxiety/fear was associated with appraisals of a poor ability to cope and the use of strategies such as focusing on the exam, substance use and difficulty distracting self from the exam. The experience of frustration/powerlessness was associated with appraisals of a low ability to cope and a high level of external control and the use of strategies such as suppression, distancing and substance use. Positive emotions were associated with appraisals of high perceived control and low external control and the use of strategies such as reappraisal and problem focused strategies e.g. studying. These findings support the role of several appraisals in determining the type of emotion generated and also suggest that the type of emotion experienced may have an important impact on emotion regulation strategy choice (Schmidt et al., 2010).

All of the empirical support discussed so far is derived from research using predominantly female student samples and may not extend to the general population. Recent research has addressed this limitation using 34 samples across 27 countries. The study assessed 142 emotion component features encompassing appraisals, bodily reactions, expression, action tendencies and feelings in order to discriminate between 24 emotions using multiple discriminant analysis (Scherer & Fontaine, 2013 as cited in Scherer, 2013). Including all emotion component features resulted in a validated hit rate of 82.10%, 70.70% of which was explained by appraisal features, 5% by action

tendencies, 5% by expression and bodily reaction and the remaining 2% by feelings. The finding that appraisals account for the largest proportion of variance in emotion discrimination supports the notion in appraisal theories that appraisals activate other emotion components which in combination result in an identifiable emotion episode e.g. anger, sadness.

Together these findings demonstrate the importance of appraisals in shaping emotional experiences, which may in turn influence how emotions are regulated. Although the research discussed does not provide an exhaustive analysis of all possible appraisals involved in emotion generation, it does demonstrate that appraisals shape emotional experience and provides support for several of the core appraisals outlined in appraisals theories (e.g. Lazarus, 1991; Scherer, 2013; Roseman, 2013). However, each of the supporting studies is based on self-reports pertaining only to emotional experience and does not offer support for the direct role of appraisals on other components of emotions such as action tendencies or physiological responses.

Research exploring the link between appraisals and physiological changes is limited. However, one such study by van Reekum et al. (2004) attempted to explore the impact on appraisals on the physiology component of emotion using a sample of 33 adolescent students by assessing responses to a computer game. Two appraisals were explored; these were goal congruence (indicated by success or failure in level completion) and pleasantness (indicated by the presence of pleasant or unpleasant sounds). It is reported that goal congruence was associated with changes in the autonomic nervous system such as changes in heart rate, skin conductance and finger temperature but not on muscle activity. Intrinsic pleasantness was reported to have little impact on physiology. This may be taken as preliminary support for a link between goal congruence appraisals and changes in the physiological component of emotion.

However, substantial methodological limitations question the validity of these findings. Firstly, appraisals were not generated or reported by the individuals, instead they were assumed to have occurred given the context e.g. completion of a level. As a result it is not clear whether findings are truly representative of appraisal or context effects. Secondly, the normative ratings of valence for the pleasant and unpleasant sounds were made by only 15 individuals; a sample of this size is inadequate to provide normative valence ratings. As a result it may have been that the participants did not appraise the sounds as pleasant or unpleasant, which may explain the lack of significant findings for this appraisal. As a result of these limitations further research is needed to explore the link between appraisals and physiological changes. This gap in the literature has recently been highlighted leading to the development of a theoretical blueprint of the resulting brain activation resulting from reappraisals regarding novelty, goal relevance, goal congruence, agency and compatibility with norms and values (Brosch & Sander, 2013). However to date this has not been empirically tested.

Overall the literature on appraisals theories and supporting empirical research helps to explain why there are individual differences in emotional experiences and in how emotions are regulated. Given the prominence of extreme emotional experiences and difficulty regulating emotions within BPD, appraisals theory appears well suited to explore potential areas of emotion regulation difficulty within this population.

#### **2.2.4. Appraisals theories of Emotion and BPF**

Dialectical behaviour therapy is a multi-component treatment for BPD that has been found to lead to a reduction in BPF severity (e.g. Linehan et al., 1993; Linehan, Armstrong, Suarez, & Heard, 1991). Research has now begun to explore why DBT is effective in reducing BPF and it has been suggested that one potential mechanism of change is the neutralisation of unhelpful appraisals via mindfulness techniques (Lynch,

Chapman, Rosenthal, Kuo, & Linehan, 2006). This, together with research demonstrating a negative appraisal bias (e.g., Baskin-Sommers et al., 2012; Domes et al., 2008; Dyck et al., 2009; Mitchell et al., 2014; Wagner & Linehan, 1999), suggests that unhelpful emotional appraisals impact on emotion regulation problems associated with BPF. Therefore this supports the use of an emotion appraisals perspective to assist understanding in the emotion regulation problems associated with this population.

Appraisals regarding goal relevance and goal type refer to whether or not a goal is at stake for the individual and determine if and what type of emotions are likely to develop. Research has reported that the avoidance of threats or harm is a predominant goal with BPD populations which differentiates BPD from mood disorders (Atre-Vaidya & Hussain, 1999). According to appraisals theory stimuli relating to this goal should be salient to the individual and trigger an emotional response. Consistent with this, research indicates that individuals with high levels of BPF are hypersensitive to words that are highly relevant to the borderline personality construct as determined by experienced clinicians. For example words relating to rejection, abandonment, anger and rage, all of which may be taken to represent threat or harm (Korfine & Hooley, 2000).

The appraisal of self/norm compatibility refers to the evaluation of a situation's likely consequences in relation to one's ideal self and or social expectations. This may be of particular importance when attempting to understand the emotional experiences of individuals with high levels of BPF. An unstable sense of self is a core part of BPD and therefore BPF, as a result appraisals regarding whether or not a situation corresponds with the individual's internal self-representations may too be unstable resulting in an unpredictable pattern of emotional responding. This is consistent with emotion instability reported in this population (e.g. Nica & Links, 2009).

Finally, in the previous chapter it was highlighted how low self-efficacy surrounding emotion regulation is associated with BPF and may be one factor contributing to emotion regulation difficulties in this population. Appraisals theory explains how an individual's perceived ability to deal with and/or change an emotional situation may alter the emotion experienced and therefore may be well placed to assist in the exploration of emotion regulation difficulties associated with BPF.

Overall, appraisals theory of emotion is a well-positioned theory from which to explore features of emotion regulation and emotion regulation problems associated with BPF. It provides a strong explanation as to why individual differences in emotional experiences exist, facilitates understanding of emotional problems associated with BPF and is supported by empirical research (e.g. Schmidt et al., 2010; Siemer et al., 2007).

The process model of emotion regulation (Gross, 1998; Gross & Thompson, 2007) is based upon appraisals theory and offers a detailed account of the emotion regulation process, supported by empirical findings. This model has become dominant in the emotion regulation literature and is commonly used as a framework from which to explore individual differences in emotion regulation and how this may impact on the success of emotion regulation attempts. The concept of emotion regulation will now be explored using the process model and associated literature to identify factors influencing emotion regulation success which may be relevant to BPF.

### **2.3. Emotion Regulation**

The term emotion regulation refers to an individual's ability to choose what emotions they have, when they have them and how they experience and express these emotions (Gross, Richards, & Oliver, 2006). This definition of emotion regulation highlights the possibility of altering the likelihood of an emotional response occurring as well as taking actions to alter specific emotion components once activated. This is

consistent with the components of emotion regulation outlined by Linehan (1993); the ability to reduce emotionally relevant stimuli as well as to reduce active components of emotion when emotion is intense. In addition Linehan (1993) highlights the need for the individual to be able to experience and label emotions as a pre-requisite for emotion regulation. Based on this knowledge the individual can make a decision on if/how different emotions should be regulated, thus producing emotion regulatory goals. In line with this, Gross, Sheppes and Urry (2011) suggest that for emotion regulation to take place there initially needs to be a desire or goal to alter the quality, duration or intensity of one's emotional responses (Gross et al., 2011). Once an emotion regulation goal is decided several processes may act to alter the emotional experience. Emotion regulation goals and processes can be explicit (conscious, deliberate and monitored) or implicit (outside of conscious awareness, automatic) and it is suggested that both explicit and implicit processes are necessary for effective emotion regulation (Mauss, Bunge, & Gross, 2007).

Effective emotion regulation is an important part of wellbeing. Emotion dysregulation has been implicated in a wide range of psychopathologies e.g. mood, anxiety, substance and eating disorders (Aldao & Nolen-Hoeksema, 2012), and is considered to be the main causal mechanism in others, such as borderline personality disorder (Linehan, 1993). This has led to a rapid increase in research exploring the process of emotion regulation to improve understanding about what is required for effective emotion regulation (Koole, 2009). A great deal of this research is based on the process model of emotion regulation (Gross, 1998; Gross & Thompson, 2007). In this section the process model of emotion regulation is outlined and the empirical literature on explicit and implicit emotion regulation processes is reviewed to identify factors influencing emotion regulation success.

### 2.3.1. The Process Model of Emotion Regulation

The process model of emotion regulation is based on the modal model of emotion (Gross, 1998; Gross & Thompson, 2007). The modal model (Figure 2.2) was developed to represent key components in emotion generation that have remained largely consistent across the theoretical literature, and draws strong parallels with appraisal theories. This model was subsequently used as a framework from which to establish an understanding about how emotions are regulated. The model suggests that in order for an emotion to occur there first needs to be a physical or mental situation. This situation must gain the attention of the individual who will then make several appraisals about the situation resulting in the activation of an emotional response, which may be experiential, physiological, behavioural or any combination of these factors.

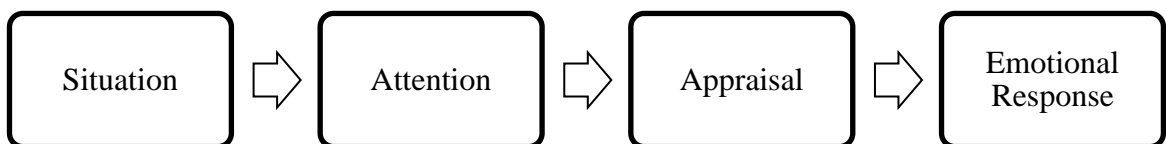


Figure 2.2. The Modal Model of Emotion Adapted from Gross and Thompson (2007).

Gross (1998), similar to Lazarus (1991), suggested that an emotional response may be regulated by altering any stage in its generation. This led to a theoretical analysis of a vast array of emotion regulation techniques to identify the processes underlying them and the stage of emotion generation that these processes acted on. Five emotion regulation processes were identified, which accounted for all of the emotion regulation strategies found in the literature. The five emotion regulation processes identified can be more broadly split into: antecedent-focused and response-focused processes. Antecedent processes are implemented before the emotion is fully generated and include: situation selection, situation modification, attention deployment and



cognitive change. Response focused processes are implemented after the emotion is fully generated and includes only response modulation. Figure 2.3 provides a definition for each emotion regulation process identified in the model and illustrates where each process has its impact in the emotion generation process.

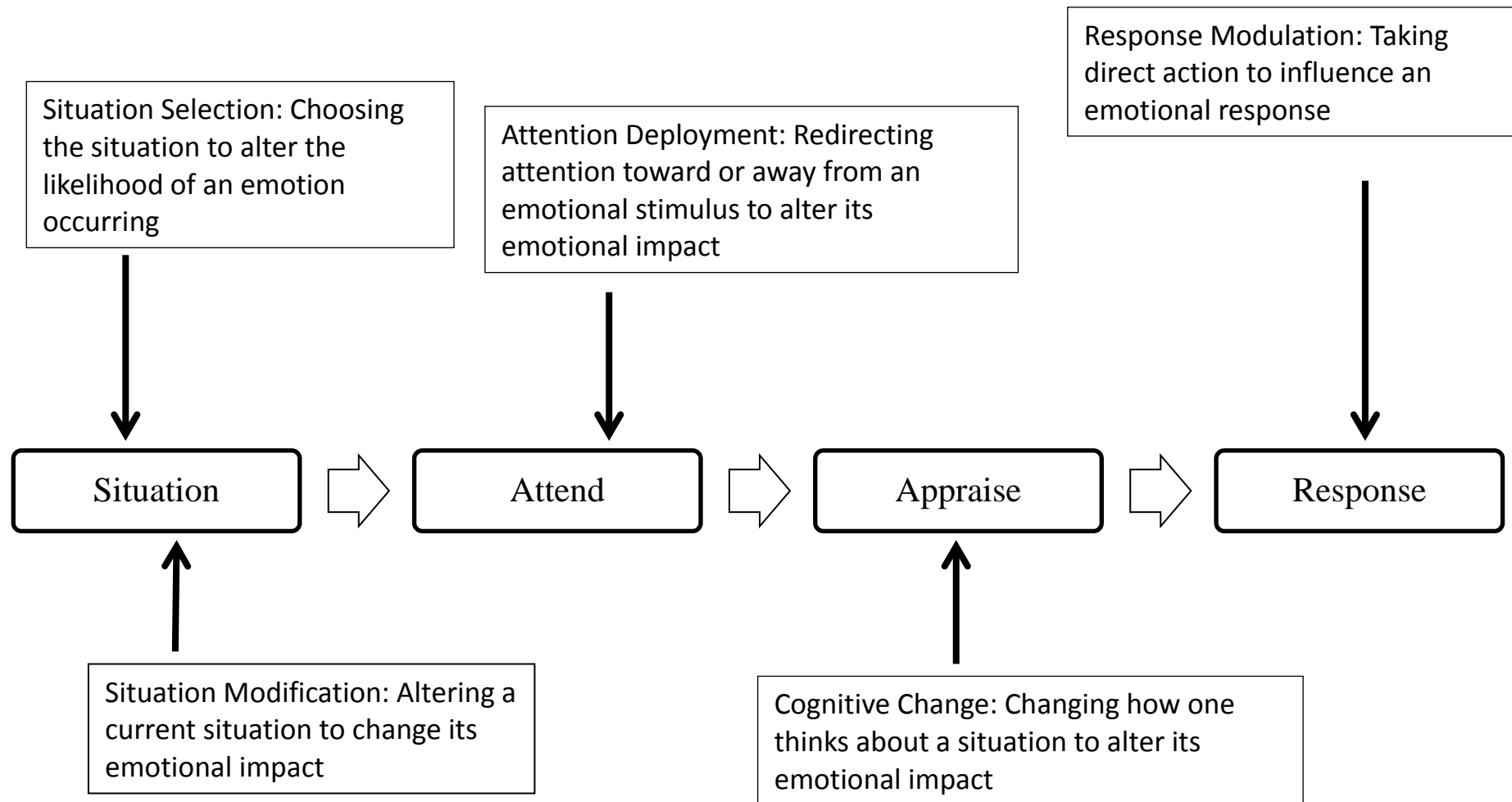


Figure 2.3. The Process Model of Emotion Regulation

### **2.3.2. Emotion Regulation Success: The Generic Timing Hypothesis**

Based on the Process Model of Emotion Regulation it was initially proposed that antecedent-focus strategies which act at the point of appraisal or before would be more effective than response-focused strategies taking place after physiological, behavioural and subjective response tendencies have been activated (Gross, 1998). This is because antecedent-focused strategies alter the presence or relevance of an emotional stimulus before emotional responses are generated and as a result emotion intensity is low. This is referred to as the generic timing hypothesis as it suggests that the earlier in the emotion generation process an emotion regulation attempt takes place the more successful it is likely to be (Sheppes & Gross, 2011). In order to test this hypothesis research began to explore the influence of antecedent versus response-focused strategies on emotional outcomes. Gross (1998) attempted to investigate this using a gender balanced sample of 120 students and comparing the effects of reappraisal, a cognitive change strategy, and suppression, a response modulation strategy, whilst watching a disgust inducing film clip. Experiential, behavioural and physiological emotional responses were recorded. Findings indicated that reappraisal was associated with decreased subjective experience and expression of disgust and no difference in physiological responding relative to the control group. Suppression was associated with no difference in subjective experience, decreased emotional behaviour, and increases physiological responding. These findings suggest that overall reappraisal is the more effective strategy reducing two out of three emotional responses and provides support for the hypothesis that antecedent-focused strategies are more effective than response focused strategies. However, the success of a strategy appears to be dependent on which component of an emotional response is being targeted: if the goal was to reduce emotion expression then both strategies are equally effective.

The importance of the target of an emotion regulation attempt has also been identified in a meta-analysis of studies investigating the effectiveness of emotion regulation strategies derived from the process model of emotion regulation (Webb, Miles, & Sheeran, 2012). It was found that effect sizes for different strategies varied according to the type of emotion response assessed i.e. experience, behaviour or physiology. In studies looking at emotional experience using self-report measures, cognitive change was found to be more effective than response modulation and attention reorientation, which did not differ from each other. For behavioural responses, response modulation was found to be more effective than cognitive change which in turn was more effective than attention re-orientation. For physiological responses, attention reorientation and cognitive change were both more effective than response modulation.

The effects of reappraisal and suppression have also been compared using an anger induction task. Consistent with previous findings (Gross 1998), it was reported that individuals who were instructed to reappraise the situation reported less anger experience than individuals who were instructed to suppress or accept their anger. Further to this, it was found that the reappraising individuals were likely to continue with a frustrating task longer than either of the other groups (Szasz, Szentagotai, & Hofmann, 2011). This indicated that in addition to decreasing unpleasant emotional experiences, reappraisal may also facilitate helpful behavioural responses to the environment.

The previous two studies each adopted experimental designs to establish the short-term effects of using reappraisal and suppression. Although useful these studies do not detail the potential long term effects of these strategies in real-life situations. Gross and John (2003) attempted to address this issue by developing a questionnaire to assess individuals' general use of reappraisal and suppression in everyday situations.

Individuals that regularly use reappraisal were found to experience and express more positive and less negative emotions. Reappraisal use was also found to be associated with increased interpersonal functioning and wellbeing including self-esteem and life satisfaction. Conversely, individuals who frequently used suppression experienced less positive emotion, greater negative emotion and demonstrated poorer interpersonal functioning and well-being including more depression symptoms, less life satisfaction, less optimism and lower self-esteem (Gross & John, 2003).

Together, these three studies (Gross, 1998; Gross & John, 2003; Szasz et al., 2011) may be taken as evidence that antecedent emotion regulation strategies are more effective than response focused strategies. However, there are several major problems with this conclusion. First, it is only theorised that reappraisal acts earlier (and thus under lower emotional intensity) than suppression. The time of initiation or emotional intensity has not been directly manipulated. Therefore, although research demonstrates differences in the effects of reappraisal and suppression these are not directly attributable to the timing of implementation. Second, the two strategies had differential consequences depending on which emotional response you look at. Therefore the target of the emotion regulation attempt needs to be established in order to determine how successful the strategy is. For example, if the purpose of emotion regulation is to hide an emotion then suppression and reappraisal are equally effective. Third, the strategies themselves differ in their target as well as timing. For example, reappraisal targets cognition/appraisals which have previously been linked to emotional experience whereas suppression targets behaviour directly. Therefore it is reasonable to expect that reappraisal would have a larger effect on subjective experience and suppression on behaviour.

### **2.3.3. Emotion Regulation Success: The Process-Specific Timing Hypothesis**

Recently an alternative hypothesis has been put forward to explain the differential patterns of emotion regulation success observed across different emotion regulatory processes. This is the process-specific timing hypothesis (Sheppes & Gross, 2011). This hypothesis suggests that processes involved in emotion regulation and emotion generation compete for cognitive resources at earlier or later stages of information processing. Strategies which act on early processing stages require minimal effort and thus are unaffected by emotional intensity. However, strategies that act on later processing stages will require increased effort proportional to the intensity of the emotion and therefore their performance may decrease under high emotional intensity. This hypothesis was developed from empirical findings, which will now be considered.

Sheppes and Meiran (2007) conducted a series of studies to explore online emotion regulation. Online emotion regulation means that, in contrast to past research which has instructed participants how to regulate their emotions before or after an emotion eliciting event, participants were instructed to either reappraise or distract, before, early during or late during a sadness inducing film clip. Several important findings were reported. First, the efficacy of distraction appeared unimpaired by initiation time suggesting that distraction may be an effective strategy even in the presence of intense emotion. Reappraisal on the other hand, was found to be less effective when initiated later, suggesting that reappraisal becomes less effective with increasing emotional intensity. Second, late initiation reappraisal was still effective if employed for a longer duration, indicating that the duration as well as timing may be important in determining emotion regulation success. Finally, distraction but not reappraisal was found to be associated with a poorer memory for the emotional event. This last finding has been further supported by research reporting that distraction and

reappraisal appear to utilise independent cognitive processes (Sheppes & Meiran, 2008). This was achieved by asking sample of 46 predominantly female undergraduate students to view an emotion inducing film clip whilst using either distraction or reappraisal. Immediately after the film clip participant undertook a classic Stroop test to assess self-control and a surprise memory test for details from the film clip. It was found that distraction but not reappraisal led to impaired memory of the film clip after strategy initiation. This indicated that distraction acts immediately to reduce encoding of the emotional information. While reappraisal but not distraction led to depleted self-control. This suggests that reappraisal requires substantial self-control in order to stop and override established emotional appraisals (Sheppes & Meiran, 2008). Further physiological evidence has also been found for the costs of late reappraisal with increased sympathetic activity, previously associated with self-control, being found in the presence of reappraisal but not distraction (Sheppes, Catran, & Meiran, 2009). This illustrates that distraction and reappraisal involve separate cognitive processes, which are influenced differently by emotional intensity.

The process specific timing hypothesis and supporting research suggests that emotion regulation success is influenced by a combination of strategy and emotional intensity. Different emotion regulation strategies require different cognitive resources and therefore each have their own context specific advantages and disadvantages. It therefore appears that the ability of an individual to select an appropriate emotion regulation strategy for the situation may have a major impact on emotion regulation success.

#### **2.3.4. Emotion Regulation Success: Strategy Choice**

Past research has identified and explored the effectiveness of several emotion regulation strategies, demonstrating that the consequences of different strategies may

vary according to context. In line with this, it has been suggested that for psychological wellbeing it is important that an individual is able to select and implement various emotion regulation strategies flexibly according to situational demands (Kashdan & Rottenberg, 2010). This implies that the process of choosing the best strategy for a given situation is likely to impact on the success of an emotion regulation attempt. Recent research has informed the development of a new framework to explain how individuals select emotion regulation strategies (Sheppes et al., 2012).

The basis of this framework is consistent with the process-specific timing hypothesis and suggests that the processes involved in emotion generation and regulation are in competition for cognitive resources (Sheppes et al., 2012). Empirical support for this framework is based on two stages in the emotion generation process. These are the attention stage via attention re-orientation (e.g. distraction) or the appraisal stage via cognitive change (e.g. reappraisal). As discussed previously, the two emotion regulation strategies used as examples here, distraction and reappraisal, utilise different cognitive processes and thus have different benefits and costs. The relative importance of these costs and benefits are dependent on the situation. For example, distraction blocks emotional information before it is fully processed and therefore may be useful when high intensity emotional information is present (Sheppes & Meiran, 2007). However, as the emotional information is never fully processed, memory for the emotional information is lost (Kross & Ayduk, 2008; Sheppes & Meiran, 2008; Sheppes, Scheibe, Suri, & Gross, 2011). This may be detrimental if the emotional stimuli are likely to be encountered again. On the other hand, reappraisal involves in depth processing of the emotional information leaving memories for emotional information in-tact (Richards & Gross, 2000). However, reappraisal is less effective when emotional intensity is high due to the high cognitive demands of generating a reappraisal which is in direct conflict with the emotion generation appraisal



(Sheppes & Meiran, 2007). It is suggested that in order to choose an emotion regulation strategy the individual makes situation specific cost benefit analysis based on the emotion intensity, cognitive demand of the strategy and motivational goal emotion regulation strategy choice. Research exploring each of these factors in relation to emotion regulation choice will now be explored.

First, research has investigated the impact of the *emotional intensity* on emotion regulation strategy choice using experimental protocols. Sheppes et al. (2011) presented participants with emotional images and instructed them to choose either distraction, which requires disengaging with the emotional stimuli, or reappraisal, which requires engaging with the stimuli in order to change how one thinks about it. It was found that when emotional intensity was high individuals were significantly more likely to choose distraction over reappraisal and when emotion intensity is low individuals were significantly more likely to choose reappraisal over distraction. Further to this, and consistent with past research (Richards & Gross, 2000; Sheppes & Meiran, 2007, 2008), it was reported that distraction but not reappraisal was associated with impaired memory for the emotional stimulus. These findings support the conceptualisation of distraction as a disengagement strategy, which interferes with memories for emotional information, and the conceptualisation of reappraisal as an engagement strategy, which leaves memories of emotional information intact. Further to this, the findings demonstrate that emotional intensity may impact on an individual's decision to use engagement or disengagement emotion regulation strategies. Acknowledging the limited ecological validity of using images to induce emotion, Sheppes et al. (2011) repeated the experiment using electric shocks of varying intensity in place of the pictorial emotion stimuli. Consistent with findings using pictorial stimuli reappraisal was more likely to be selected in anticipation of a low intensity shock and distraction in anticipation of a high intensity shock.

Further to this, Sheppes et al. (2012) demonstrated that the effect of emotional intensity on strategy choice remains even when participants are offered a monetary reward for selecting the counter preference regulation strategy. For example participants were still more likely to select distraction in the presence of intense emotional stimuli even when offered a monetary reward for the use of reappraisal. This demonstrates that the preference for distraction in the presence of intense emotional states is robust and may be resistant to change despite knowledge that selecting reappraisal may have alternative benefits.

Together these findings indicate that the intensity of an emotion influences emotion regulation choice, as such, disengagement strategies were preferred during high emotional intensity and engagement during low emotional intensity irrespective of potential counter-preference benefits (Sheppes et al., 2012, 2011). The replication of this finding across four different student samples suggests that this finding can be generalised across student populations. However, the small sample sizes for each analysis ( $N < 28$ ) questions the validity of these findings and as such these findings must be considered with caution.

In addition to the intensity of the emotion to be regulated it has been suggested that perceived cognitive demand of a strategy may also influence emotion regulation choice (Sheppes et al., 2012). In general the cognitive demand of reappraisal, which requires engaging with emotional stimuli, is greater than distraction, which requires disengaging and thus not processing stimuli. As a result it has been suggested that individuals may be more likely to select distraction during high emotional intensities where cognitive demand is already high. Sheppes et al (2012) investigated the impact of the perceived *cognitive demand* required to employ distraction and reappraisal in a small sample of 12 student participants. In order to assess the influence of perceived

cognitive demand instructions for the generation of distraction and reappraisal strategies were provided to half of the participants (reducing the cognitive demand in generating the strategy), whilst the remaining participants were required to generate their own distraction and reappraisal strategies. It was found the participants that were given specific instructions on how to reappraise were more likely to choose reappraisal than those who were given no instruction and required to generate the strategy for themselves. This suggests that the perceived difficulty in strategy generation influences strategy choice. However, the main effect of intensity remained in both groups indicating that regardless of cognitive demand individuals still preferred to use distraction when emotional intensity was high and reappraisal during low emotional intensity. This may explain why individuals might make poor strategy choices despite knowledge of more helpful strategies.

Finally, the internal motivations behind emotion regulation has also been theorised to influence emotion regulation choice (Sheppes et al, 2012). Emotion regulation strategies have been said to achieve one of two potential types of motivational goals: hedonic goals or instrumental goals (Tamir, 2009). Emotion regulation for hedonic purposes refers to attempts to decrease unpleasant emotions and increase pleasant emotions in the short term. Emotion regulation for instrumental purposes refers to influencing emotions to facilitate the attainment of long term goals. It was hypothesised that if an individual demonstrates hedonic goals they may be more likely to use distraction, which involves disengaging from the emotional stimulus providing immediate relief from unwanted emotions. However if the individual believed that they were likely to come into contact with the stimulus in the future (long-term goal) then reappraisal may be preferred as it involves engaging with the emotional stimulus, facilitating emotional learning. Sheppes et al. (2012) investigated the impact of *motivational goal* on emotion regulation strategy choice using a gender balanced

sample of 22 students. Consistent with past findings it was found that participants were more likely to choose distraction when emotion intensity was high and reappraisal when emotion intensity was low. However, the selection of reappraisal significantly increased when participants were provided with a long term emotion regulation goal and believed that they would encounter the stimulus again in the future. This demonstrates that an individual's goal for immediate emotional relief versus long term emotional learning significantly influences emotion regulation choice. However, as the short versus long term goals were explicitly stated and participants were asked to select the strategy that would make them feel less negative, these findings may reflect knowledge of the impact of strategies rather than reflecting how strategies would be selected in real life situations. Nevertheless and despite the small sample size this preliminary finding highlights that individuals are aware that the utility of strategies may vary according to the emotion regulation goal.

The above discussed research (Sheppes et al., 2012, 2011) regarding emotion regulation choice suggests that the intensity of an emotional response at the time of its regulation has a major impact on strategy choice over and above factors such as motivational goals and perceived cognitive demand. In addition the effects of motivational goals (long versus short term) and perceived cognitive demand of the strategy also influence emotion regulation choice, but are secondary to emotion intensity. Although these studies provide preliminary support for factors influencing emotion regulation choice findings must be considered in light of methodological limitation. Firstly emotion intensity was inferred from the intensity of the emotional stimuli and no manipulation check was in place to assess the actual emotion intensity for each participant. As a result further research is required to assess the direct impact of the intensity of an emotional response on emotion regulation choice. Secondly, the sample sizes for each experiment were very small ( $N < 28$ ) therefore further research is

needed to examine and replicate these findings in larger more representative samples. Finally, only two strategies have been considered here and further research is required to explore how these factors may influence choice of other types of strategies identified in the process model of emotion regulation (Gross, 1998).

A major limitation in all of the research discussed so far is the assumption that individuals use strategies in a 'one or other' manner and have investigated emotion regulation strategies in isolation. This is despite Gross's process model of emotion regulation suggesting that individuals may utilise several emotion regulation strategies during an emotional episode (Gross & Thompson, 2007).

#### **2.3.5. Emotion Regulation Success: Number of Strategies**

More recently Aldao and Nolen-Hoeksema (2013) have explored the use of multiple strategies for the regulation of one emotional episode of disgust in a predominantly female sample of 111 adults from the general population. Following viewing of the film clip participants were asked to rate the extent which they experienced a range of emotions and the extent to which they used a range of emotion regulation strategies. It was found that of the 87% of the participants that reported engaging in emotion regulation, 65% reported the use of more than one strategy. In addition, it was found individuals using only one strategy reported that they used it to a greater extent than those using multiple strategies. This may be an indication that individuals choosing only one strategy implemented it for a longer period of time and those using multiple strategies appeared to divide their effort across all strategies used. In line with this individuals using more than one strategy reported higher levels of disgust (Aldao & Nolen-Hoeksema, 2013). This may be indicative that the use of multiple strategies is a less effective approach to emotion regulation or that those individuals with more intense emotional responses tend to use more emotion regulation

strategies. Therefore the impact of multiple strategies on emotion regulation success warrants further research.

### **2.3.6. Implicit Emotion Regulation Processes**

Earlier in this chapter it was stated that appraisals theory suggests that emotion regulation processes may be carried out explicitly or implicitly (Gross, 1998, 2013; Mesquita & Frijda, 2011). Explicit emotion regulation refers to processes that require conscious effort to initiate, monitoring during implementation and awareness throughout. Implicit emotion regulation processes are triggered automatically by the emotional stimuli and run without monitoring or conscious awareness. All of the research explored in this thesis so far has focused on the use of explicit emotion regulation processes, which have been associated with cognitive costs (Richards & Gross, 2000; Sheppes & Meiran, 2008). Given that emotion regulation demands are present on a moment-to-moment basis, it is unlikely that emotion regulation is always conducted using conscious, cognitively demanding strategies. Instead it is suggested that implicit emotion regulation processes may also be at work to facilitate the high demand of moment-to-moment emotion regulation (Gyurak, Gross, & Etkin, 2011) and therefore may have an impact on overall emotion regulation success (Mauss, Bunge, et al., 2007).

The empirical investigation of implicit processes is difficult, as due to their very nature they are not quantifiable via self-report measures. As a result some studies have examined neurological activity patterns as an indicator of implicit emotion regulation processes. One such study attempted to investigate the presence of implicit reappraisal (Mocaiber, Garcia, Smith, & Machado-Pinheiro, 2010). This was achieved by displaying neutral or unpleasant images as distracters during an attention task, whilst monitoring brain activity. Before each task block participants were informed that the

pictures were either real or fictitious. It was found that brain activity and reaction times were modulated by the picture valence only in the real picture blocks. From this it was concluded that implicit reappraisal of the pictures as fictitious was influencing the emotional response (Mocaiber et al., 2010). However, it is not clear from these findings whether the information regarding the picture (real or fictitious) was used to appraise or reappraise the image. This is consistent with the well documented difficulty of disentangling emotion generation from emotion regulation (Gross & Barrett, 2011; Mauss, Bunge, et al., 2007). In order to suggest implicit *reappraisal* it would be expected that brain activity for real and fictitious pictures would peak equally, followed by a more rapid decline for the fictitious images. Yet, this is not explored within the research of Mocaiber et al (2010).

An alternative approach to the investigation of implicit emotion regulation process is through the investigation of implicitly held values and goals (Gyurak et al., 2011). Past research has indicated that personal goals, defined as mental representations of a desirable outcome, can be implicitly held and activated outside of an individual's awareness, leading to changes in self-regulatory behaviour (Bargh, Gollwitzer, Lee-chai, & Trotschel, 2001). Based on the theory that implicit goals may influence behaviour without intention or conscious awareness it has been theorised that these motivational forces may be the core mechanism driving implicit emotion regulation (Mauss, Bunge, et al., 2007).

Research by Mauss, Evers, Wilhelm and Gross (2006) explored this theory in the context of emotion regulation. Based on the theoretical assumption that valuing of a construct is associated with the presence of that construct as a goal, a variant of the implicit association test (IAT) was developed to assess positive and negative implicit evaluations about emotion regulation and their association with emotional responses. A female sample of 42 student participants first completed an anger provocation task

whilst being monitored for physiological (cardiovascular activity) and behavioural (facial/verbal expressions) responding and subsequently reported their deliberate emotion regulation attempts, emotional experiences and thoughts. Participants then returned to complete the emotion regulation –IAT (ER-IAT; Mauss, Evers, Wilhelm & Gross, 2006) on average 26 days later ( $SD=47$ ). It was found that the presence of positive implicit evaluations of emotion regulation was associated with less experience of anger, fewer negative thoughts, and a reduced cardiovascular response. Yet they were not associated with self-reported use of explicit emotion regulation strategies behavioural displays of anger during the induction task. This is an indication that having implicit goals of emotion regulation, relative to emotion expression, is associated with favourable emotional responses without the need for explicit strategy use. However, the causality of this relationship must be treated with caution due to findings being based solely on correlation analyses. In addition, Mauss et al. (2006) did not explore whether these implicit emotion regulation processes were associated with any costs that have previously been associated with explicit emotion regulation, such as memory impairments for the emotional stimuli (Richards & Gross, 2000).

This has been explored more directly examined in research investigating whether implicit emotion regulation processes are associated with any costs such as increased experience of other negative emotions (Mauss, Cook, et al., 2007). In a sample of 114 female students, emotion regulation goals of expression versus regulation were implicitly activated using a sentence unscrambling priming technique. After the priming participants took part in an anger provocation task during which physiological responses were recorded. Following this, participants were asked and provided self-reports of negative emotion experience, including anger. Findings revealed that when emotion regulation goals, rather than emotion expression goals, are implicitly activated individuals demonstrate significantly less anger. Importantly, this was not found to be



associated with increases in other negative emotion experiences e.g. sadness, anxiety or physiological responding. This suggests that implicit valuing of emotion regulation is beneficial for emotion regulation without the unhelpful consequences, such as increased physiological responding, that is associated with some explicit emotion regulation strategies such as suppression (Gross, 1998). However, the finding that the two conditions did not differ on physiological responding also suggests that this form of emotion regulation is only helpful for regulating one component of an emotional response: emotional experience. In addition, in this study explicit attempts to regulate emotions were not assessed or controlled for and therefore it cannot be assumed that the priming task led to implicit emotion regulation processes rather than increasing motivation for explicit emotion regulation attempts.

Consistent with this, Hopp, Troy and Mauss (2011) suggest that implicit valuing of emotion regulation may increase motivation for emotion regulation attempts, but the individual still needs the ability to use adaptive emotion regulation strategies to promote psychological health assessed using self-report questionnaires on wellbeing, depressive symptoms and social adjustment. This hypothesis was tested using a gender balanced community sample of 222 participants. Findings revealed implicit valuing of emotion regulation predicted psychological wellbeing only for participants who habitually use reappraisal, a helpful emotion regulation strategy. This suggests that implicit valuing of emotion regulation is an important factor for psychological health only when paired with helpful emotion regulation strategies (Hopp et al., 2011).

In addition to the impact of implicit valuing of emotion regulation, it has also been proposed that implicit beliefs regarding utility of emotions may motivate explicit emotion regulation behaviours (Tamir, Chiu, & Gross, 2007). This was based on the theory that emotion regulation goals may be hedonic (to seek immediate internal pleasure) or utilitarian (to achieve a long term goal) (Tamir et al., 2007) and is

consistent with appraisal theories of emotion that suggests that a situation may be relevant to an individual based on appraisals internal pleasure and/or goal consistency (Scherer, 2013). When these appraisals result in conflicting outcomes these outcomes compete for dominance with the appraisal that is most valued in the situation, i.e. pleasure or goal attainment, activating the behavioural response (Mesquita & Frijda, 2010).

Tamir, Chiu and Gross (2007) explored whether individuals demonstrate counter-hedonic implicit representations of the motivational utility of emotions and whether these implicit representations predict emotion regulation behaviour. This was investigated using a gender balanced sample of 50 undergraduate students. Implicit representations of emotion utility were assessed using a double primed (goal and emotion) lexical decision task. In this task participants were presented with a goal, followed by an emotion, followed by a target word. Participants were instructed to indicate whether the target word was a real word or a non-word using designated keys on a computer keyboard. The goal was either to obtain success (approach goal) or avoid failure (avoidance goal) and the emotion either an unpleasant avoidance emotion e.g. worry or a pleasant approach emotion e.g. excitement. The target word was a high utility word such as useful, a low utility word such as unnecessary, or a non-word such as pipul. Reaction times to the target word were recorded with shorter reaction times representing stronger associations. Participants were also asked to report their preferred emotion inducing activity (fear, sad, worry, and calm) prior to a threatening task.

It was found that participants demonstrated implicit beliefs about the utility of emotions regardless of associated pleasure. For example, if the goal was to avoid failure, worry was judged as a useful emotion despite being intrinsically unpleasant. In addition it was found that implicit but not explicit representations of emotion utility

were found to influence explicit emotion regulation actions. This suggests that implicit processes may be major motivational forces for explicit emotion regulation. More specifically, individuals that demonstrated implicit utility for worry in the context of avoidance goals were significantly more likely to select a worry inducing activity prior to a threatening task (Tamir, Chiu & Gross, 2007). This suggests that whether or not an individual perceives an emotion as useful within a specific goal context may determine both ‘if’ and ‘how’ they choose to regulate their emotions. None of the other implicit utility scores were found to predict emotion regulation behaviour. However this research did not explore emotion inducing preferences when faced with an approach orientated task e.g. to obtain success. Therefore it is unclear how perceived implicit utility may impact on positive emotion regulation.

#### **2.4. Summary and Integration of findings**

In summary, research conducted to date in the field of emotion regulation has highlighted several factors which may impact on the success of an emotion regulation attempt, some of which may be relevant to emotion regulation problems associated with BPF. Here the findings from the emotion regulation literature will be integrated with findings from the literature on borderline personality (reviewed in chapter 1) to identify likely causes of emotion regulation problems associated with BPF.

Firstly the emotion regulation literature highlights the importance of the type of emotion regulation strategy used in determining emotion regulation success (Webb et al., 2012). It has also been found that strategies vary in their success depending on the type of emotional response being targeted (e.g. behavioural, physiological, and experiential)(Gross, 1998a; Webb et al., 2012). Research looking at emotion regulation in relation to BPF suggests that individuals with high levels of BPF are more likely to use unhelpful emotion regulation strategies. However, this research has primarily

investigated the use of unhelpful strategies to regulate negative emotions in this population, with little consideration of the potential for helpful strategies to also be used (e.g. Conklin et al., 2006). Therefore it is not clear whether these individuals use only unhelpful strategies or a full range of helpful and unhelpful strategies. If it is found that these individual have knowledge of and use helpful strategies, this could be capitalised on during treatment. If these individuals are not aware and do not make use of more helpful strategies then educational interventions surrounding helpful emotion regulation strategies may be more appropriate.

Secondly, the emotion regulation literature highlights that the intensity of an emotional response at the time it is regulated may have a major impact on the emotion regulation process. It has been found that the intensity of an emotion has a robust effect on the selection of an emotion regulation strategy; intense emotions encourage the selection of disengagement strategies such as distraction (Sheppes et al., 2012, 2011). In line with this, the intensity of the emotion to be regulated has been found to impact on emotion regulation success and that this impact can vary according to the type of strategies used (Sheppes & Meiran, 2007, 2008). For example, reappraisal is often considered to be a highly effective emotion regulation strategy. However, when initiated under high emotional intensity the effects of reappraisal diminish, whereas the effects of distraction remain unaffected by emotional intensity. Taken together these findings may indicate that emotion intensity has a functional influence on emotion regulation choice, creating preference for the likely most effective strategy. However reappraisal may also be effective under high emotional intensity if used for a prolonged period of time (Sheppes & Meiran, 2007). Reappraisal also has the benefit of leaving memories of the emotional information intact thus facilitating long term emotion regulation, should the same situation be encountered again in the future (Richards & Gross, 2000). Also, and consistent with findings regarding the benefits of longer period of emotion regulation, it

has been reported that the use of multiple strategies over shorter periods of time may be less effective than one strategy over a long period of time (Aldao & Nolen-Hoeksema, 2013). These findings are highly relevant to the literature on emotion dysregulation associated with BPF as will now be discussed.

It has been consistently reported that individuals with BPF are likely to experience more intense emotions than those with low BPF (e.g., Ebner-Priemer et al., 2007; Levine et al., 1997; Stein, 1996; Yen et al., 2002). However, it remains unclear whether high emotion intensity is a cause or consequence of poor emotion regulation. This is because past research has assessed emotion intensity either generally, or before and after emotion induction procedures. For this reason it is unclear whether BPF are associated with higher emotional intensities at the time of strategy initiation. If this is the case it may be a factor contributing to emotion regulation problems as the effectiveness of some strategies reduces under high emotional intensity. Therefore it may be that these individuals attempt to use helpful emotion regulation strategies but they are less effective. If it is not the case that individuals with BPF demonstrate higher emotional intensity at the time of strategy initiation it may be that the high emotion intensity results from poor emotion regulation attempts rather than being a cause of emotion regulation problems.

In order for some strategies to remain effective under high emotional intensities they would need to be implemented over a long period of time. In line with this it has been found individuals with high levels of BPF are able to use a range of strategies (including strategies considered to be unhelpful) to successfully regulate emotions when instructed to employ the strategies over a set period of time (Chapman et al., 2009; Jacob et al., 2011). However, as individuals with BPF are reported to demonstrate low distress tolerance in the pursuit of emotion regulation goals and quit distressing tasks

significantly earlier (Gratz et al., 2006), it may be that these strategies will not be used for a sufficient time period in real life situations. As a result the duration of emotion regulation attempts has potential to be a problematic feature of emotion regulation associated with BPF.

Thirdly, it has been suggested that some emotion regulation processes may occur implicitly (Gyurak et al., 2011), via implicitly held values and goals influencing appraisal outcomes and the subsequent generation of future emotional responses (Mesquita & Frijda, 2011). Empirical research has shown that implicitly held values associated with emotional experiences but have also been found to influence emotion regulation behaviours (Mauss, Cook, et al., 2007; Mauss et al., 2006; Tamir et al., 2007). Therefore disturbances in implicit values of emotion and emotion regulation could contribute to emotion regulation problems. To date research exploring emotion regulation in relation to BPF has focused on explicit rather than implicit emotion regulation processes. Consequently, it is not known whether individuals with higher levels of BPF demonstrate different implicit goals and values regarding emotion and emotion regulation to individuals with low levels of BPF. If it is found that these individuals differ in their implicit values regarding emotions and emotion regulation this would facilitate understanding of the motivations behind unhelpful emotion regulation behaviours in this population.

To conclude, this chapter has highlighted several factors that may impact on the success of emotion regulation: type of strategy used, intensity of the emotion to be regulated, duration of emotion regulation attempts and implicit values. There is evidence to suggest that some of these factors may be highly relevant to emotion dysregulation associated with the presence of BPF. Yet to date the relationship between these factors and BPF has not been fully explored. The research included in this thesis

sought to address this gap in the current literature by exploring each of these factors in relation to BPF. The next chapter presents the aims of the thesis and provides a full discussion of the methodologies used.

## **Chapter 3 – Aims and Methodology**

### **3.1. Overview**

This chapter begins by presenting the aim of the thesis and an overview of the research questions addressed in each study. This is followed by a general discussion regarding sample selection and recruitment for all studies included in this thesis. Finally, the methodology and data analysis techniques used for each study are discussed.

### **3.2. Aims of the thesis**

The previous two chapters suggest that individuals with Borderline Personality Features (BPF) and Borderline Personality Disorder (BPD) experience difficulties in regulating their emotions. However, it is not yet clear why this is the case. Several factors have been found to impact on emotion regulation success within the emotion regulation literature. To date these factors have not been explored in relation to BPF. The overall aim of this thesis is to improve understanding of how individuals with high levels of BPF regulate their emotions and what characteristics within these attempts might be problematic. In order to achieve this, several factors that have previously been reported to impact on emotion regulation success were explored in relation to BPF in a series of studies. Study 1 explored how the types of strategies, targets of emotion regulation e.g. physiological, behavioural or experiential and experiences of emotion regulation compared between individuals with high and low levels of BPF. Study 2 included three studies which shared one extended data collection period. To acknowledge this, these studies will be referred to as studies 2a, 2b and 2c. Study2a builds on study 1 by quantifying the type and number of strategies used by this population for positive and negative emotion regulation. Study2b explored factors in the implementation of emotion regulation strategies, which may influence strategy choice and emotion regulation success. This included emotion intensity at the time of its regulation, duration of emotion regulation attempts and likelihood of explicit emotion



regulation attempts occurring. Finally study 2c explored implicit evaluations surrounding emotion utility and emotion regulation in relation to BPF.

### **3.3. Methodology**

#### **3.3.1. Sample Selection**

All studies included in this thesis set out to explore emotion regulation in relation to BPF. As a result the first stage in designing the research project was to identify an appropriate population to sample and method for assessing BPF/BPD. When selecting the research population several issues, both theoretical and practical, were taken into account. Firstly, the population would need to display a range of BPF. Past research has indicated that BPF can be found in both clinical and non-clinical populations. According to a dimensional model of personality disorder, problematic personality features associated with BPD are distributed within the general population along a severity continuum. In this context the clinical population represents an extreme subset (Widiger & Trull, 2007) and are likely to demonstrate less of the variability in levels of BPF than in non-clinical samples (Cohen & Cohen, 1984; Trull, 1995). Non-clinical samples have been found to include individuals with a range of BPF scores: low BPF (not associated with psychological difficulties), high BPF (associated with psychological difficulties and poor long term outcomes) and extreme BPF scores (predictive of a diagnosis) (Fonseca-Pedrero et al., 2011; Gardner & Qualter, 2009b; Korfine & Hooley, 2009; Trull et al., 1997; Trull, 1995). Therefore research using a non-clinical sample may be beneficial in representing the full spectrum of BPF scores rather than only extreme scores included in BPD.

Secondly, the population needed to demonstrate a balanced gender split to allow generalisation of findings. It has been frequently reported that in clinical samples the prevalence of BPD is higher in women than men (Black et al., 2007; Widiger & Trull, 1993). It was acknowledged that in order to gain a mixed-gender clinical sample,

several clinical services and NHS trusts would need to be accessed. Local clinicians were contacted to explore the feasibility of this. Feedback indicated that this would be a very time consuming process due to limited numbers of individuals within each service, especially those with BPD, and other active research projects recruiting from the same population. This was therefore outside the timeframe of the planned research. In non-clinical student samples it has been reported that there are less gender differences in the prevalence of BPF, although the types of features likely to be present, for example, impulsivity or affective instability, may vary according to gender (Fonseca-Pedrero et al., 2011; Gardner & Qualter, 2009b).

Thirdly, in order to improve understanding in this area detailed investigations are needed, such as interview and experience sampling based studies. These methodologies require a level of insight and commitment from research participants. It was anticipated that individuals in clinical settings may experience difficulty engaging with this type of research as a result of low distress tolerance (Gratz et al., 2006), limited emotional awareness (Levine et al., 1997) and a lack of insight into symptoms and related behaviours (McDermutt & Zimmerman, 2005). Therefore, a community sample was considered. However, national statistics indicate that approximately 71% of the population of Great Britain are currently employed and of these 73% are in full time employment (Office for National Statistics, 2013). This may prevent engagement in experience sampling methodology, which requires multiple self-reports to be made throughout the day. In university student populations the average contact time when the students are in formal structured lectures/seminars, is 13.40 hours per week with 15.01 hours per week private study time (GfK, 2011). Although contact times do vary by institution and subject, this indicates that a student population are able to work more flexibly and therefore able to participate more easily with minimal disruption to their daily routine.

Based on the aforementioned considerations a non-clinical university student population was selected. The investigation of BPF within student samples has advantages. First, research investigating BPF in non-clinical populations may be useful to aid understanding of how BPF develop. Second, exploring BPF in a student sample, where individuals are generally under the age of 25, may be of particular benefit as BPF have been found to demonstrate considerable malleability at this age (Lenzenweger & Castro, 2005). Findings, should they be replicated, may thus be used to inform the development of early intervention services, preventing BPF from becoming a stable and problematic part of personality. It is acknowledged that findings drawn from specific human populations, such as university students, may not be representative of the world population (Henrich, Heine & Norenzayan, 2010). However, research demonstrating that high levels of BPF are present and problematic within university student populations (Trull et al., 1997), highlights the need for a better understanding of BPF in this specific population. In addition the findings from this research may be used to guide research investigating BPF and emotion regulation in the wider population by highlighting potential areas for investigation.

### **3.3.2. Recruitment Procedure**

Past research exploring the presence of BPF in non-clinical student samples reports that high levels of BPF are only present in a small proportion of the population: approximately 15-33% (Gardner, Qualter, & Tremblay, 2010; Johnson & Bornstein, 1992; Trull, 1995). In order to ensure that sufficient levels of BPF were present within the sample a targeted recruitment approach was utilised. This involved using advertisements which displayed questions relevant to BPF such as ‘Do you act without thinking? Do you have concerns about being left by others? Do you experience strong emotions?’ (See Appendix 1). In addition more general advertisements for the study were used that invited participants to take part in a study exploring personality and

emotion regulation increasing the overall sample size and ensuring individuals with both high and low levels of BPF were invited to take part (Appendix 2).

It was acknowledged that the use of a targeted recruitment approach may increase the numbers of individuals experiencing more general emotional problems and mood disorders. In order to monitor this, self-report assessments for depression and anxiety were introduced in order to identify general mood problems in the research sample. When possible, depression and anxiety scores were controlled for in statistical analyses.

### **3.3.3. Assessing the presence of BPF in the non-clinical research sample**

Across all studies included in this thesis it was necessary to assess the presence of BPF. In line with the dimensional model of personality disorders (Widiger & Trull, 2007), many researchers have begun to explore the presence of BPF in non-clinical populations using self-report questionnaires (e.g. Gardner & Qualter, 2009b; Trull et al., 1997; Trull, 1995). This approach is useful for the identification of individuals demonstrating BPF which may not necessarily reach the criteria for diagnosis. Three commonly used screening measures for BPD, which assess the presence of BPF are the personality assessment inventory- borderline scale (Morey, 1991), the personality diagnostic questionnaire- borderline scale (Hyler, 1994) and the McLean screening instrument for BPD (Zanarini et al., 2003). The psychometric properties for each of these measures have recently been explored in a non-clinical population. It was reported that all three measures demonstrated good internal consistency ( $\alpha = .91, .81, .86$ , respectively) and were highly correlated with each other ( $r = .84$  to  $.86$ ) (Gardner & Qualter, 2009b), suggesting the reliable assessment of the same underlying construct. A limitation of using such self-report measures to assess the presence of BPF is that they have been found to produce a high rate of false positives (Farmer & Chapman, 2002).

To address this limitation, studies in this thesis used two self-report measures of BPF and aggregated scores: a method that has been found to reduce false positives and improve reliability (Rushton, Brainerd, & Pressley, 1983). When the BPF score was treated as a categorical variable this involved only individuals scoring above cut-off scores on both measures being classified as high BPF. Individuals who scored below the cut off on one or both measures were considered low BPF (Overholser, 1992). Typically the concept of false positive lends itself to categorical data (e.g. identifying somebody as high BPF when they are in fact not). However, measurement error in continuous data may still lead to elevated scores. Therefore on a continuous personality measure an individual may score higher for the presence of BPF than is actually representative for them (Rushton, Brainerd, & Pressley, 1983). By combining multiple measures these errors in measurement are averaged out resulting in a more accurate representation. Thus in this thesis thus when the BPF score was used as a continuous variable the total scores from each BPF measure were averaged to provide an overall score of BPF. This approach had been found to improve the reliability of personality disorder detection in clinical and non-clinical samples (Morse & Pilkonis, 2007).

In order to maximise reliability whilst minimising the time commitment for participants it was decided that only two measures of BPF would be used: the personality diagnostic questionnaire (Hyler, 1994) and the personality assessment inventory (Morey, 1991). The PDQ-4-BOR was selected due to its brevity and ease of administration. The PAI-BOR was selected as it provides a more comprehensive assessment of several of the BPD criteria stated in DSM-IV. Detail on the content and psychometric properties of each of these measures is now presented.

*Personality Assessment Inventory – Borderline Scales (PAI-BOR; Morey, 1991)*

The 24-item PAI-BOR scale was taken from the larger 344 item personality assessment inventory designed to assess personality pathology according to DSM-IV diagnostic criteria (Morey, 1991). The PAI-BOR scale was used to provide a global score of BPF. Each item is a statement, e.g. 'My mood can shift quite suddenly', to which participants respond using a four-point Likert scale (0-3) to illustrate how much the statement was true of them (0-False to 3-Very True). The total BPF score has good internal consistency ( $\alpha=.86$ ) and test re-test reliability ( $r=.82$ ) in a non-clinical sample (Morey, 1991) and has been found to converge highly with other screening measures of BPD including the PDQ-4 ( $r=.85$  to  $.86$ ) (Gardner & Qualter, 2009b). PAI-BOR scores  $>38$  indicate the presence of BPF (Trull, 1995) and this was the cut off score used in this thesis where BPF was treated as a categorical variable.

*Personality Diagnostic Questionnaire-4 Borderline Scale (PDQ-BOR; Hyler, 1994)*

The PDQ-BOR was taken from the larger personality diagnostic questionnaire-fourth edition (Hyler, 1994), a 99-item self-report screening measure based on criteria for personality disorder according to the DSM-IV (American Psychiatric Association, 2000). The PDQ-BOR contains 9-items designed to screen for the presence of BPF. Each item is a statement e.g. 'I'll go to extremes to prevent those who I love from ever leaving me'. Considering each statement in the context of the 'past several years' participants are required to indicate whether the statement is 'True' (1) or 'False' (0) of them. Previous research using the PDQ-BOR as a screening tool in non-clinical populations has reported good internal consistency ( $\alpha=.81$ ) and was found to converge highly with other screening measures of BPD including the PAI-BOR ( $r=.84$ - $.85$ ) (Gardner & Qualter, 2009b). A score  $>5$  indicates clinically significant levels of BPF (Johnson & Bornstein, 1992), consistent with DSM-IV scoring for BPD (American

Psychiatric Association, 2000), and was therefore used as the cut-off score in this study. In addition subscales for other cluster B personality traits (antisocial, histrionic, narcissistic) were also included to allow exploration of the specificity of study findings to BPF.

Several difficulties in the assessment and classification of BPD according to DSM-IV-TR (American Psychiatric Association, 2000) have been raised. These include an overlap of symptoms with other personality disorders, high levels of heterogeneity within personality disorder diagnoses (Blais & Norman, 1997) and the use of arbitrary diagnostic thresholds (Trull et al., 1990). In order to reduce the impact of some of these limitations several methodological decisions were made. Firstly, the presence of other cluster B personality disorder features have been assessed in each sample and where possible have been controlled for in analyses. This will allow the investigation of the specificity of findings to BPF rather than personality disorder per se. Secondly, when possible the BPF score was treated as a continuous rather than dichotomous variable. This acknowledges personality pathology existing on a severity continuum and allows the investigation of varying degrees of pathology. Thus far, the topics of sample selection and assessment of BPF has been discussed generally as these topics are applicable to all studies included in this thesis. Now the methodological decisions made for each individual study included in this thesis will be discussed in turn.

#### **3.3.4. Study 1**

##### *Study 1: Qualitative Methodology*

Qualitative methodology was used to address the first research question: How do individuals with high versus low levels of BPF compare on the types of strategies, targets of emotion regulation (e.g. physiological, behavioural or experiential), and experiences of emotion regulation? Past research has attempted to explore the types of strategies used by individuals with high levels of BPF or BPD using questionnaire based

measures (e.g. Conklin et al., 2006; Salsman & Linehan, 2012) or by looking at the use of specific unhelpful strategies within this population (e.g. Brown et al., 2002). These approaches have two major limitations. Firstly, they only allow information to be obtained about the use of a limited number of pre-defined categories of emotion regulation strategies. Research has identified that differences exist within these categories, for example, reappraisal may involve reappraising an emotional response or reappraising an emotional stimulus and that subtle variation within the strategy used may have an impact on emotion regulation success (Webb et al., 2012). This is not accounted for in questionnaire based measures. Secondly, they do not allow exploration of what the individual hoped to achieve by using the strategy. Past research has demonstrated that different strategies may be effective for regulating some emotional responses but not others e.g. behaviour and subjective experience, respectively. Therefore what an individual hopes to achieve from using the strategy is important to help determine whether or not the strategy is likely to be successful.

Qualitative methodology was selected to allow individuals to talk openly about how they regulate their emotions in their own words. It was anticipated that this would allow detailed understanding of the types of strategies used as well as information about why these strategies were used and what individuals hoped to achieve from emotion regulation. As discussing emotional experiences may be a sensitive topic for some participants, it was decided that data would be collected on a one-to-one basis rather than in groups. This was to provide a higher degree of confidentiality and a safe environment where participants could discuss their personal experiences of emotion and emotion regulation. As a result three methods of data collection were considered: unstructured interviews, semi-structured interviews or an open ended survey. During an unstructured interview the interviewer is guided largely by the interviewee who is encouraged to speak freely about a given topic. This approach can be very useful to



gain a broad understanding of an individual's behaviour and/or experiences. However, in the current investigation there are specific areas of interest within the area of emotion regulation. Therefore, in order to ensure that the required data were obtained and that participant time was not wasted, a more structured approach was required. An open-question survey would allow the researcher to ask a set of specific questions relating to the aims of the research, whilst allowing participants to respond in their own words. This would be beneficial as it would allow relevant information to be obtained from the perspective of the participant. However, it was considered that responses may not provide enough detail and that any new lines of enquiry that may be of interest to the researcher could not easily be explored. Semi structured interviews allow the researcher some control in directing the topic of the conversation and the encouragement of detailed discussions, whilst allowing participants to speak freely and describe in their own words how they regulate their emotions. The researcher is also able to further explore interesting lines of enquiry presented by the participant during the interview. For these reasons one-to-one semi-structured interviews were selected as the most appropriate method to address the research question in study 1.

#### *The semi-structured interview protocol*

All interviews were conducted on a one-to-one basis by the same researcher (the author of this thesis). This allowed continuity across participants in interview style as well as allowing the researcher to identify new patterns in the data as they emerged. To ensure that all areas of interest were covered with each participant a topic guide was developed. The topic guide was designed to encourage conversation about emotional experiences and how individuals attempt to regulate their emotions using four lead questions each followed by a series of possible prompts to promote further discussion.

1) '*What does the term emotion mean to you?*' Prompts focused on encouraging individuals to think about different types of emotions and to compare emotions in order to encourage more detailed information on their emotional experiences.

2) '*Do you think humans have the ability to influence their emotions?*' Prompts encouraged discussion about the individual's perceived control over emotions.

3) '*Can you tell me about a time when you have tried to influence your emotions?*' This question was designed to encourage discussion about techniques used by the individual to regulate their own emotions. Prompts following this question encourage participants to consider positive and negative emotions and the specific actions they take to influence emotion. Where possible, participants were encouraged to provide examples of situations and strategies used.

4) '*Did that work for you/ how do you know that that strategy was effective?*' This encouraged discussion of the perceived effectiveness of strategies and to identify what the individual hopes to achieve in attempting to regulate the emotion, such as the target of the emotion regulation attempt. It also provided an opportunity for difficulties in emotion regulation to be discussed.

All interviews were digitally recorded to allow transcription and analysis at a later date. In addition to the interview a number of self-report questionnaires were also administered, which are now discussed

#### *Study 1: Self-report Questionnaires*

##### *Positive and Negative Affect Schedule (PANAS; Watson et al., 1988)*

The PANAS is a 20-item measure which comprises two scales: one 10 item scale assessing positive affect, for example '*Interested*' or '*Excited*' and one 10 item scale assessing negative affect, for example '*Distressed*' or '*Upset*'(10-items). The scales have been reported to demonstrate good internal consistency for the current

moment in a non-clinical population ( $\alpha=.89$ ,  $.85$ , respectively) (Watson et al., 1988). The PANAS was used to assess current affective state at the time of the interview.

#### *Centre for Epidemiology Studies-Depression Scale (CES-D; Radloff, 1977)*

The CES-D was included to monitor levels of depression in the research sample as past research has highlighted high levels of co-morbidity between BPD and mood disorder (Grant et al., 2008). The CES-D is a short 20-item self-report questionnaire designed to measure depression symptoms in the general population. Participants are required to respond by indicating how often they have experienced a range of symptoms of depression over the past week (e.g. 'I felt like I could not shake off the blues even with help from my family or friends'). The scale has been validated in a non-clinical sample and was found to demonstrate good internal consistency ( $\alpha=.85$ ) and adequate test-retest reliability ( $r=.54$ ).

#### *Study 1: Data Analysis*

Interview transcripts were analysed using thematic analysis. The selection of thematic analysis as the approach to data analysis over other qualitative strategies such as Interpretive Phenomenological Analysis (IPA) or Grounded Theory was driven by the research questions for the present study. The current study aimed to investigate patterns in how and why individuals regulate their emotional experiences and to identify whether or not identified patterns relate to the presence of BPF. The specific research questions driving the current study have been informed via careful evaluation of past theory and research. The decision to explore these research questions using qualitative research techniques was underpinned by methodological rather than theoretical considerations, as previously discussed. IPA is an idiographic approach, designed to allow researchers to gain a detailed understanding of how an individual experiences a given phenomenon (McLeod, 2001). This strict ideological approach would not allow the research questions to be addressed as they require exploration of similarities and

differences between groups of individuals. Grounded Theory is an approach designed to develop theory grounded in the data (McLeod, 2001). Methodologically, the techniques used in grounded theory are similar to those used in thematic analysis in many ways (Braun & Clarke, 2006) and for this reason the use of grounded theory was carefully considered. However, in grounded theory, analysis is directed toward the development of new theory from the data (Holloway & Todres, 2003). As such the researcher is to begin with as few predetermined ideas as possible. Thus grounded theory was not appropriate as the research has already identified the type of emotion regulation strategy and target of emotion regulation as specific targets of interest, based on the past literature. Thematic analysis is an analytical procedure whereby through careful reading and re-reading of the data patterns are identified as being important to the description of a given subject (Daly, Kellehear, & Gliksman, 1997). These themes then become categories for further analysis. This approach is well suited to allow the identification of patterns in the data which may then be compared and contrasted in further analyses.

Thematic analysis was conducted based on procedures outlined by Braun and Clarke (2006). Familiarisation with the data was achieved through transcription of all interview recordings by the primary researcher and listening to interview recordings twice, prior to formal coding. Each transcript then underwent sentence-by-sentence coding. This process was conducted blind to BPF classification, i.e. whether the transcripts belonged to the high or low BPF group, to avoid bias in coding. Initial coding was conducted in detail, in many cases this resulted in initial codes being descriptions of the data (i.e. distracts self from unwanted thoughts). This was to ensure that nothing was missed that may later develop into a theme. The initial codes were then refined and collated across transcripts into broad themes. Each theme underwent further analysis, grouping together similar themes and reviewing coding as new themes emerged. This stage of analysis was conducted on the full dataset regardless of BPF

classification to avoid bias in coding. To ensure scientific rigour 10% of transcripts were also coded by another researcher experienced in this type of analysis; codes were then compared, amended and discussed until agreement was reached (Frommer & Rennie, 2001).

### **3.3.5. Study 2a**

Unlike qualitative analysis, the use of self-report questionnaires allows the extent to which different strategies are used to be quantified. Therefore study 2a aimed to build on the findings of study 1, which explored the range of strategies used, to identify if some types of strategies are used more than others within this population.

#### *Study 2a: Self-report Questionnaires*

Study 2a provided a quantitative investigation of the type and number of strategies reported for the regulation of a range of positive and negative emotions. This was achieved using self-report questionnaires. Some of the questionnaires have already been described in detail above: PDQ-4 (Hyer, 1994), PAI-BOR (Morey, 1991), CES-D. Study 2a included two additional measures, the Emotion Regulation Profile-Revised (ERP-R; Nelis, Quoidbach, Hansenne, & Mikolajczak, 2011) to explore the number and type of emotion regulation strategies used and the Generalised Anxiety Disorder 7-item scale (GAD-7; Spitzer, Kroenke, Williams & Lowe, 2006) to explore and control for anxiety levels in the sample. The GAD-7 was selected as through continual exploration of the available literature (post design of study 1 and the commencement of data collection) it was concluded that anxiety disorders, in addition to depression, also demonstrated enough co-morbidity with BPD to warrant its inclusion in the research as a control variable (Grant et al., 2008). The Emotion Regulation Profile-Revised (ERP-R; Nelis, Quoidback, Hansenne & Mikolajczak, 2011) was selected to assess the type and number of emotion regulation strategies used during an emotional episode. This

questionnaire was selected as it included items for both positive and negative emotion regulation, and the former have been neglected in past research looking at BPF. Further to this the questionnaire allows for the selection of multiple emotions regulation strategies in response to one emotional episode.

The Generalised Anxiety Disorder 7-item scale (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) is a seven item screening measure for anxiety disorder which has been used to assess levels of anxiety in the general population. Each item details an anxiety related experience e.g. 'Feeling anxious, nervous or on edge' and the participant is required to indicate how much they have experienced this over the last week using a 4-point Likert scale ranging from 0- not at all to 3- nearly every day. In the current study the GAD-7 was found to demonstrate excellent internal consistency ( $\alpha=.90$ ).

The Emotion Regulation Profile-Revised (ERP-R, Nelis, Quoidback, Hansenne & Mikolajczak, 2011) is a 16-item vignette-based questionnaire designed to assess the use of helpful and unhelpful strategies in the regulation of both positive and negative emotions. The measure contains two subscales: down-regulation of negative emotion (eight items) and up- regulation of positive emotion (eight items), demonstrating good internal consistencies in a British sample ( $\alpha=.73, .84$ ) (Pfleger, n.d.). This measure was included in a questionnaire pack with a number of other questionnaires. In order to reduce participant fatigue only eight items were used: four items assessing regulation of positive emotion (Excitement, Happiness, Pride and Gratitude) and four items assessing regulation of negative emotion (Anger, Guilt, Sadness and Shame). These items were selected as they demonstrate the highest loadings onto the positive and negative subscales (Pfleger, n.d.). Each item consisted of a vignette describing a situation where the individual is likely to experience a particular emotion e.g. *'You've been driving around for more than 30 minutes looking for a parking space. When you finally find a free parking space, the driver of another car overtakes you and takes your place from*

*right under your nose. Obviously that makes you angry!’* Following each vignette eight responses are described, each reflecting an emotion regulation strategy: four helpful strategies and four unhelpful strategies. For example, a response representing the helpful strategy rumination would be *‘You say to yourself that it’s not that serious after all. You’re trying to look for the positive angle, e.g. maybe you’ll find a parking space closer to where you have to go’* and a response representing the unhelpful strategy learned helplessness would be *‘You have always had difficulties in asserting yourself and you don’t see what you could have done. You feel discouraged’*. Participants were required to select the responses that best describe how they would respond in that situation, and were informed that they may select as many responses as applied.

#### *Study2a: Data Analysis*

Study 2a sought to explore the relationship between BPF and the type and number of emotion regulation strategies used in positive and negative emotion regulation episodes. To ensure the specificity of any findings to BPF it was necessary to take into account a number of control variables that have previously been associated with BPF including, age, gender, depression, anxiety and cluster B personality features. All analyses were conducted using hierarchical multiple regression (HMR). This allowed theoretically derived variables or groups of variables to be entered into the model sequentially thus permitting the contribution of each variable or group of variables to be explored prior to the inclusion of the variable of interest: BPF.

The hierarchical order of the predictor variables entry was determined theoretically adhering to the principles of causal priority and research relevance (Cohen & Cohen, 1983). Model 1 included the demographic variables of age and gender as these have previously been found to influence emotion regulation (Blanchard-Fields, Stein, & Watson, 2004) and cannot be caused by any of the other predictor variables. Model 2 added mood disturbance scores for depression (CES-D) and anxiety (GAD-7). Past

research has demonstrated high levels of co-morbidity between BPD and anxiety and depression, therefore these variables were entered early in the model allowing the contribution of personality features above and beyond mood disturbance to be assessed. Model 3 added cluster B personality scores (PDQ-AS, PDQ-HIS, and PDQ-NAR) with the exception of BPF which was added in the final model. These personality features were added as control variables as they have been found to co-exist with BPF (Farmer & Chapman, 2002), therefore by controlling for these features findings can be attributed to BPF specifically rather than more general personality pathology. Model 4, the final model, added the variable of interest the BPF total score. Therefore the  $R^2$  statistic for Model 4 is representative of the amount of variance in the DV uniquely explained by BPF above and beyond demographics, mood disturbance and general cluster B personality pathology. In total six HMR were conducted with varying dependent variables: (1) Unhelpful Negative Emotion Regulation Strategies (2) Helpful Negative Emotion Regulation Strategies (3) Number of Strategies for Negative Emotion Regulation (4) Unhelpful Positive Emotion Regulation Strategies (5) Helpful Positive Emotion Regulation Strategies and (6) Number of Strategies for Positive Emotion Regulation.

### **3.2.6. Study 2b**

#### *Study 2b: Experience sampling methodology*

Experience sampling methodology (ESM) was selected to investigate factors in the implementation of emotion regulation strategies. ESM is a technique which involved prompting participants to make self-report ratings at several time points throughout the day within an individual's natural living environment (Larson & Csikszentmihalyi, 1983). This methodology has also been referred to as ecological momentary assessment (Shiffman, Stone, & Hufford, 2008), ecological ambulatory assessment (Fahrenberg, Myrtek, Pawlik, & Perrez, 2007) or real time data capture



(Stone & Broderick, 2007). All of these terms relate to the same type of methodology and for ease the term ESM will be used throughout this thesis.

There are many methodological limitations of past emotion regulation research that can be addressed using ESM. Firstly, past research has indicated that the accuracy of information regarding emotional experiences may be limited when recalled retrospectively (e.g. Ben-Zeev, Young, & Madsen, 2009). Particularly relevant for this thesis, it has been found that individuals with a diagnosis of BPD demonstrate a tendency to overestimate negative emotional experiences and underestimate positive emotional experiences, when reporting retrospectively. In contrast, healthy controls were found to display the opposite and demonstrated underestimation of negative emotion and overestimation of positive emotion (Ebner-Priemer et al., 2006). This demonstrates that retrospective recall data for emotional experiences may be inaccurate, compromising the validity of research findings. It has also been found that the length of the time lag between experience and reporting is positively related to the degree of inaccuracy (Broderick et al., 2008). This suggests that to obtain accurate information regarding emotional experiences the time lag needs to be as short as possible.

Secondly, the emotion regulation literature suggests that emotional intensity *at the time of emotion regulation* is likely to influence emotion regulation success (e.g. Sheppes & Meiran, 2007). To date several research studies have explored emotional intensity in relation to BPF (e.g. Stein, 1996; Stiglmayr et al., 2005). However, none have looked specifically at the emotional intensity at the time a regulation attempt was made.

Finally, past research has relied on the use of hypothetical scenarios, laboratory induction techniques and instructed emotion regulation paradigms in order to explore emotion regulation in relation to BPF. None of these approaches can be considered truly representative of how emotion regulation would occur in real life situations. In

order to help individuals with high levels of BPF to better regulate their emotions it is first necessary to establish what is going wrong. In order to achieve this it is necessary to assess emotion regulation as it occurs in real life situations.

ESM can address all of these limitations. Firstly it requires participants to report their experiences in, or close to, real-time increasing accuracy and reducing bias associated with retrospective recall (Ebner-Priemer & Trull, 2009). Secondly, it allows emotional intensity to be assessed at the time when emotion regulation occurs. Finally, ESM can assess experiences and behaviours as they are generated in response to real life situations. This can increase the ecological validity of study findings. Based on these advantages ESM was selected as the most appropriate methodology to explore factors in the implementation of emotion regulation strategies.

#### *Developing an ESM protocol*

The first stage of developing an ESM Protocol is to determine the method of prompting participants to respond and collecting response data. Several approaches have been used in past research and each has advantages and disadvantages, displayed in Table 3.1.

Table 3.1. Advantages and Disadvantages of Various Methods for Experience Sampling Methodology

ESM Method	Advantages	Disadvantages
Beeping watch prompt and paper diary	<p>Easy and inexpensive to develop.</p> <p>Easy for participants to use and transport.</p>	<p>Watches are expensive to purchase and may be lost by participants.</p> <p>Participants may not respond at the time of prompt.</p> <p>Paper diary may be lost or forgotten.</p>
Text message prompt and paper diary	<p>Easy and inexpensive to develop.</p> <p>Mobile phone would be carried anyway.</p> <p>Participants can set phone to loud/ silent as necessary.</p>	<p>Participants may not respond at the time of prompt.</p> <p>Paper diary may be lost or forgotten.</p>
Smartphone application for prompt and data collection	<p>Participants are not required to carry additional equipment.</p> <p>Able to monitor response times.</p>	<p>Difficult and expensive to develop application.</p> <p>Some participants may not have a Smartphone.</p>
Personal Digital Assistant (PDA) for prompt and response	<p>Able to monitor response times.</p>	<p>Expensive to purchase.</p> <p>More likely to be lost or stolen.</p>

The second stage is to identify the number of prompts to be made per day and the number of days over which participants will be asked to take part. Past research has varied widely on the number of prompts and duration of data collection. Empirical research suggests to increase validity the possible time between the experience and the prompt needs to be minimised (Broderick et al., 2008), indicating that prompts need to be made frequently. However, frequent prompts increases demand on participants and as a result may increase the likelihood of dropout.

In order to maximise participation and minimise demands on the participant a short survey was conducted, using university students to explore the acceptance of experience sampling methodologies. The survey asked four multiple choice questions designed to assess the acceptable number of prompts per day, days of participation, time to complete the diary per prompt, and method of prompt delivery. A total of N=108 (n=15 males, n=83 females) university students responded, 77% of which were undergraduate students. The mean age for the sample was 23.74 years. When asked about the method of prompt delivery 77% said that they would prefer to be prompted by text message. When asked about the acceptable number of prompts per day 51% indicated willingness to respond to 5-10 prompts per day and a further 12% indicated that they would be willing to respond to more than 10 prompts per day. When asked how long they would be willing to spend completing an ESM diary on each prompt 74% of participants responded indicating 5 minutes per prompt as acceptable. Finally when asked how many days they would be willing to participate in an ESM study 30% indicated that they would be willing to take part for 6-10 days with a further 34% indicating that they would be willing to participate for 11-15 days. Results discussed here only include the majority responses which will be used to inform the design of study 2, for full details on survey data please see Appendix 3.

Based on findings from this survey, common practice within the published literature and available resources, the ESM protocol was set. Participants were prompted 6 times per day via text message for 7 days. The start and end times for prompts were set individually according to the participant's daily routine; each participant indicated a 12 hour block during which they would most likely be awake. The ESM diary was developed and tested to ensure that completion took no longer than 5 minutes per prompt. In addition participants were offered either shopping vouchers (up to the value of £20) or participation credits (required for their course) in return for their time.

The ESM Diary (Appendix 4) first required participants to provide a rating for their current positive and negative emotion intensity using the corresponding scales from the Positive and Negative Affect Scales (PANAS; Watson, 1988), described above. Then, participants were asked to think about their most negative emotion since the last prompt and asked whether they made a conscious attempt to alter the emotion, 'yes' or 'no'. If participants reported 'yes' they were asked to rate their negative emotion intensity at the time of regulation using the negative scale from the PANAS. They were then asked to indicate whether they tried to increase, maintain or decrease the negative emotion, how they attempted this and for how long in minutes. These questions were then repeated for positive emotions.

#### *Study 2b: Self-report questionnaires*

All data collected for study 2a, 2b and 2c were obtained via one extended period of data collection, and therefore many of the self-report measures are consistent across studies. Study 2b used data from the demographics questionnaire, CES-D, GAD-7, PDQ-4, PAI-BOR. In addition, the difficulties in emotion regulation questionnaire (DERS; (Gratz & Roemer, 2004) was also included as it allows the investigation of

deficits in components of emotion regulation and has previously been used to identify problematic areas of emotion regulation for individuals with BPF (e.g. Salsman & Linehan, 2012). The DERS is a 36-item questionnaire that assesses difficulty in emotion regulation. This measure has been validated within a university student population and demonstrates demonstrate a good level of internal consistency. The overall scale ( $\alpha=.93$ ) contains six subscales: Non acceptance ( $\alpha=.85$ ), for example, *'When I'm upset, I feel ashamed with myself for feeling that way'*; Goals ( $\alpha=.89$ ), for example, *'When I'm upset, I have difficulty thinking about anything else'*; Impulse ( $\alpha=.86$ ), for example, *'When I'm upset, I lose control over my behaviours'*; Awareness ( $\alpha=.80$ ), for example, *'I pay attention to how I feel'*; Strategies ( $\alpha=.88$ ), for example, *'When I'm upset, I believe that wallowing in it is all I can do'*; and Clarity ( $\alpha=.84$ ) for example, *'I have no idea how I am feeling'*. The subscale 'Strategies' has previously been found to be associated with BPF and it was argued earlier in this thesis (Chapter 2) that this subscale may be taken to represent emotion regulation self-efficacy. Therefore, data from this scale will be used to represent emotion regulation self-efficacy to see if this is associated with BPF in the current sample and to see if it mediates the relationship between BPF and the duration of emotion regulation.

#### *Study 2b: Data Analysis.*

Data analysis can be challenging when using ESM due to the clustered nature of the data produced. ESM requires repeated measures to be taken over a number of days. As a result the data set is hierarchical in structure e.g. level 1-prompt per day, level 2-day, level 3 - person. This is challenging because data gathered at each prompt are not necessarily independent from each other. This is because some of the variance at level one may be explained by the fact that the data were from day one and some data from day two. As a result it is possible that the data points collected on day one are more likely to be similar to other data points collected on day 1 than data points collected on a

different day. Therefore some of the variance in measurements made at the prompt level may be attributable to time rather than individual differences.

In order to overcome this challenge multi-level modelling was used. Multi-level modelling can be beneficial when analysing clustered datasets as it allows the variance to be partitioned at different levels of the model. This allows the level of variance at the prompt level (within person variance) and at the person level (between person variance) to be examined independently. The research question dictates which variance we are interested in modelling. In study 2b the research questions indicate the need to explore whether BPF score predicts several different features of emotion regulation. BPF score is measured at the person level as each individual only completes the BPF assessment once. As a result there will be no within person variability in BPF score. Instead the model will be looking at between person variability. This will allow the investigation of whether or not between person variance in BPF score predicts between person variance in emotion regulation features.

### **3.2.7. Study 2c**

#### *Study 2c: Implicit tests*

In order to explore implicit evaluations surrounding emotion and emotion regulation in relation to BPF two implicit computer based tests were administered: The Emotion Regulation- Implicit Association Test (ER-IAT; Mauss et al., 2006) and The Emotional Utility Lexical Decision task (Tamir et al., 2007).

The Implicit Association Test (IAT) was originally developed by Greenwald, McGhee, and Schwartz (1998) to assess the presence of implicit attitudes and evaluations. The ER-IAT was subsequently developed to assess implicit evaluations of emotion regulation (Mauss et al., 2006). The measure has demonstrated good internal consistency ( $\alpha = .86$ ) and adequate test-re-test reliability ( $r = .68$ ). Significant small negative correlations were found between ER-IAT and trait emotion expression scores,

suggesting that the more an individual implicitly values emotion expression (indicated by lower ER-IAT scores) the higher their scores for trait emotion expression. In addition ER-IAT scores demonstrated significant small positive correlations with explicit suppression scores, suggesting that individuals who implicitly value emotion control (indicated by higher ER-IAT scores) report more explicit suppression. This demonstrates convergent validity of the measure; however, these correlations were small in size suggesting that the ER-IAT is assessing a different construct to these measures i.e. implicit rather than explicit.

The ER-IAT was administered on a desktop PC using E-Prime 2 software (Schneider, Eschman, & Zuccolotto, 2002). Participants were instructed to follow onscreen instructions (Appendix 5) and to respond as quickly and accurately as possible when categorising each word. All stimuli were presented in the centre of the screen in black Times New Roman size 48. The task was split into 5 blocks, each with a new set of instructions for the participant. In all blocks participants were required to use the 'F' and 'J' keys on the computer keyboard. Table 3.2 provides a breakdown of the task presented to participants in each block. Blocks 1, 2 and 4 were for practice only and contained 20 trials in each. Blocks 3 (associating positive words with emotional expression and negative words with emotional control) and 5 (associating negative words with emotional expression and positive words with emotional control) were the critical blocks and contained 20 practice trials followed by 40 critical trials.



Table 3.2. Stimuli Included in the ER-IAT

	Block 1	Block 2	Block 3	Block 4	Block 5
Task	Target-concept discrimination	Evaluation discrimination	Combined task	Reversed target concept discrimination	Reversed combined task
Instruction	F=Expression J=Control	F=Positive J=Negative	F= Expression or positive J= Control or Negative	F= Control J= Expression	F= Control or positive J= Expression or negative
Target stimuli	Control (J) Expressive (F) Cooled (J) Emotional (F) Hide (J) Reveal (F) Contain (J) Disclosure (F) Suppress (J) Discharge (F)	Pleasant (F) Negative (J) Bad (J) Gloom (J) Good (F) Gold (F) Filth (J) Honour (F) Rotten (J) Lucky (F)	Control (J) Pleasant (F) Expressive (F) Negative (J) Emotional (F) Hide (J) Bad (J) Gloom (J) Good (F) Reveal (F) Gold (F) Contain (J) Disclosure (F) Filth (J) Honour (F) Suppress (J) Discharge (F) Rotten (J) Lucky (F)	Control (F) Expressive (J) Cooled (F) Emotional (J) Hide (F) Reveal (J) Contain (F) Disclosure (J) Suppress (F) Discharge (J)	Control (F) Pleasant (F) Expressive (J) Negative (J) Emotional (J) Hide (F) Bad (J) Gloom (J) Good (F) Reveal(J) Gold (F) Contain (F) Disclosure (J) Filth (J) Honour (F) Suppress (F) Discharge (J) Rotten (J) Lucky (F)

*The Emotion Utility lexical decision task (Tamir et al., 2007)*

A lexical decision task requires participants to make a decision as to whether a target word is a real word or a non-word. The word is then often preceded by primers which are either congruent or incongruent with the word. For example if the primer is ‘medical’ and the target word is ‘doctor’ it would be expected that participants will respond faster than if the target word was ‘tree’. This is based on the spreading activation model (Collins & Loftus, 1975), which suggests that exposure to stimuli automatically activates the individual’s associated memories and evaluations for that stimuli. Therefore, if an associated word or evaluation is presented as a target the individual is likely to identify the word faster than if the word was not associated in the individual’s memory system (Wentura, 2000).

Here the lexical decision task was used to assess implicit evaluations about the utility of emotions in the attainment of goals using the procedure developed by Tamir et al. (2007). This procedure used a double prime design: one prime for goal and another for emotion. In total there were 8 goals presented, four of these were approach goals and four avoidance goals. Each goal was paired with one approach and one avoidance emotion, resulting in 16 prime pairs. Each of the 16 prime pairs was then paired with one high utility target word, one low utility target word and two non-words, making a total of 64 trials. A full list of stimuli can be seen in Appendix 6.

All stimuli were presented on a desktop PC in the centre of the screen in black, size 48 times new roman font. Primers were presented in black font and target words were presented in red text to indicate that a response was required. The goal-prime was presented on screen for 4s and participants were instructed to picture themselves perusing the goal, the emotion prime was then presented for 1s followed by the target word. Participants were required to press ‘F’ on the computer keyboard if they believed the target word was a real word and ‘J’ if they believed it was a non-word. Participants

were instructed to respond as quickly and accurately as possible and were offered a break following every 16 trials to avoid fatigue.

### *Study 2c: Analysis*

For the ER-IAT response times were recorded for each participant for all trials included in the task. Response times for Blocks 1, 2 and 4 were discarded as these blocks were for practice purposes only. Then response times for incorrect responses were removed from the dataset. This left only the correct response times for trials included in the two critical blocks, Block 3 and Block 5. Mean response times for each block were calculated for each participant. To account for within participant variance the mean reaction time was divided by the standard deviation for each participant. Consistent with study 2a and 2b the presence of any potential outliers was explored by converting reaction time scores into z-scores with absolute z-scores above 3 being taken to indicate significant outliers. No absolute z-score was above for Block 3 or Block 5. Final ER-IAT scores were calculated by subtracting the Block 3 scores from Block 5 scores. Thus higher ER-IAT scores represented more positive implicit valuing of emotion control relative to emotion expression. In order to explore the relationship between BPF and implicit evaluations of emotion regulation, ER-IAT scores were included in a Hierarchical Multiple Regression (HMR) as the dependent variable with BPF as the critical predictor variable after controlling for demographics, mood disturbance and cluster B personality features. This approach is consistent with study 2a.

For the emotion utility lexical decision task response times were recorded for each participant for all trials included in the task. Firstly, responses to non-word trials were removed from the dataset. Secondly, data relating to incorrect responses were removed from the dataset, leaving only response times for correct responses to be

included in analyses. Response times were then converted into z-scores to identify any extreme scores, no absolute z-scores were found to be above 3 and therefore all data was retained for analysis. Means were computed for each participant for each of the 8 trial combinations. In order to obtain an implicit utility score for each participant the high utility mean response times were subtracted from low utility response times for the 4 goal x emotion prime pairs. This resulted in 4 utility scores (higher scores represent higher implicit perceived utility) one for each of the goal x emotion pairs: Approach-Approach, Approach-Avoid, Avoid-Approach, Avoid-Avoid. Each of these scores was included as the dependent variable in separate HMR analyses.

### **3.4. Ethical Implications**

All studies included in this thesis obtained full ethical approval from the University of Central Lancashire Psychology and Social Work Ethics Committee. Participants interested in taking part in study 1 or study 2, were provided with a separate information sheet (Appendix 7 & 8, respectively). All potential participants were able to consider the information provided in their own time and were given the opportunity to ask questions prior to providing informed consent. Participants were reminded that participation was voluntary and that they could choose not to take part, or withdraw from the study within 2 weeks of completing participation. Non-attendance at phase 2 of study 2 was taken as an indication of withdrawal and data were removed from the dataset. All participants were provided with information for freely available support services in the participant information sheet and in the debrief sheet. This meant that in the event of any emotional distress being caused participants were able to seek appropriate, confidential support and guidance. No participants disclosed emotional distress as a result of participating in any study included in this thesis.

## **Chapter 4 – Study 1: Emotion Regulation and Borderline Personality Traits: A Qualitative Analysis.**

### **4.1. Abstract**

Little research has explored how individuals with high levels of BPF regulate their emotions. This study aimed to explore how individuals with high versus low-levels of BPF compare on the strategies they use to regulate emotions and in their experiences of emotion regulation. Twenty-nine university students were recruited and assessed for the presence of BPF using self-report questionnaires. Each participant took part in a semi-structured interview about their experiences of emotion regulation. All interview transcripts then underwent thematic analysis. Findings indicated similarities in how emotion was described and the types of emotion regulation strategies reported between the high and low-BPF groups. However, the groups differed in their experiences and thought processes surrounding emotion regulation. High-BPF participants were found to demonstrate less forward-planning in emotion regulation, have a need to communicate negative emotions with others and demonstrated difficulty maintaining attention on positive experiences.

## **4.2. Introduction**

The process model of emotion regulation, outlined in chapter 2, suggests that the success of an emotion regulation strategy may vary according to when in the generation of an emotional response a strategy has its impact (Gross, 1998a). This has more recently been referred to as the generic timing hypothesis (Sheppes & Gross, 2011). The generic timing hypothesis has been supported by empirical research which has demonstrated that emotion regulation strategies that have their impact early in the emotion generation process, such as reappraisal, are more effective at reducing the self-reported experience of emotion than response focused strategies, such as suppression (Gross, 1998a). This finding is consistent with research exploring the habitual use of reappraisal and suppression, reporting that reappraisal compared to suppression was associated with increased experiences of positive emotion, reduced experiences of negative emotion and a higher level of interpersonal functioning (Gross & John, 2003). Further to this, reappraisers, relative to suppressors have been found to demonstrate higher levels of distress tolerance; participating in a frustrating task for a longer period of time (Szasz et al., 2011). However, the impact of the emotion regulation strategies appears to be dependent on the type of emotion regulation response being investigated. For example, although reappraisal was found to decrease emotional experience and behaviour it did not appear to influence physiological responses including finger pulse rate/temperature and skin conductance (Gross, 1998a). This finding is supported by a meta-analysis of 190 studies exploring the effects of various emotion regulation strategies derived from the process model of emotion regulation (Webb et al., 2012). Results from this meta-analysis showed that the effect size of emotion regulation strategies varies according to the type of emotional response under investigation. Therefore the extent that an individual perceives their emotion regulation attempt to be

successful, is likely to be dependent on what component of emotion the individual was aiming to change (e.g. experience, behaviour or physiology).

In addition to impacting on emotional responses, as discussed above, the type of strategy used for emotion regulation has also been found to impact on interpersonal relationships (English, John, Srivastave, & Gross, 2012). More specifically increased use of suppression was associated with weaker interpersonal relationships, whereas the use of reappraisal was associated stronger interpersonal relationships. Consistent with biosocial theory (Linehan, 1993), this suggests that unhelpful emotion regulation strategies may cause problems in interpersonal functioning, a central part of the borderline personality construct.

Past theory and research in the field of BPF and BPD suggests that individuals with high levels of BPF employ more unhelpful emotion regulation strategies. The emotional cascade model (Selby & Joiner, 2009) suggests that problematic behaviours associated with BPF develop as a result of emotional cascades, in which the individual ruminates on negative affect, increasing emotional intensity. Rumination is considered to be an emotion regulation strategy that involves focusing ones attention on negative emotion experiences together with their causes and consequences (Nolen-Hoeksema, 1991). The increase in intensity, resulting from rumination, draws attention to the negative affect, encouraging further rumination. This forms a self-perpetuating cycle and explains how a mild emotional response can rapidly increase in intensity and be maintained over time. Eventually the individual is no longer able to cope with the intense emotional state and engages in extreme behaviour, such as deliberate self-injury, in order to distract oneself from emotion related thoughts and regulate their intense emotions (Selby & Joiner 2009). This model is supported by empirical research showing that the relationship between BPF and behavioural dysregulation is fully mediated by rumination scores (Selby, Anestis, Bender, & Joiner, 2009). Further to this,

research has demonstrated that both high negative affect and high levels of rumination were required to predict the presence of BPF; if either of these factors scored low the variance in BPF was not explained (Baer & Sauer, 2011; Selby & Joiner, 2013). Together, this model and supporting research suggest that the frequent use of the rumination may contribute toward intense negative emotions and behavioural dysregulation associated with BPF.

Other research in this area supports an association between BPF and unhelpful emotion regulation strategies. Conklin et al. (2006) used reports from experienced clinicians to explore the types of strategies used by individuals with a diagnosis of BPD in relation to individuals with a diagnosis of dysphoric disorder, which is characterised by persistent low mood for at least 2 years (American Psychiatric Association, 2000). It was reported that individuals with a diagnosis of BPD were found to use more unhelpful emotion regulation strategies such as externalizing strategies (e.g. blaming others), internalizing strategies (e.g. blaming self), emotional avoidance (e.g. thinking about the situation without feeling the corresponding emotion) and disorganized strategies (e.g. self-injury or risky behaviour), and less helpful strategies such as reality focused coping (e.g. responding flexibly to emotions). Consistent with this BPF have been associated with a range of unhelpful strategies including self-harm, suppression and emotional avoidance (Brown et al., 2002; Conklin et al., 2006; Rosenthal et al., 2005). Together these studies provide a strong case for an association between BPF and unhelpful emotion regulation strategies.

However there are methodological limitations that need to be considered. The study conducted by Conklin et al. (2006) relied solely on clinicians' rating of observed emotion regulation strategies and did not consider the perspective of the individual. Further to this the clinicians were not blind to the diagnosis of the patients they were rating and as such it is possible that these ratings may be biased. In addition four out of



the five types of emotion regulation strategy were considered to be unhelpful, leading to a biased view of the emotion regulation profile of this population. In remaining studies, cited above, each focused on the use of one specific unhelpful emotion regulation strategy ignoring the potential for helpful emotion regulation strategies, such as reappraisal to also be used.

Research studies exploring helpful emotion regulation strategies, such as reappraisal, in relation to BPF are limited. Neuroimaging studies have begun to explore brain activation patterns associated with reappraisal, comparing individuals with high levels of BPD with healthy controls (Lang et al., 2012). It was reported that both groups were able to successfully increase and decrease negative emotions using reappraisal, as indicated by self-reports. Differences between the two groups were identified when analysing brain activation patterns with BPD participants failing to engage cognitive control regions of the brain to the same extent as healthy controls. This is consistent with other neuroimaging studies reporting increased activation of emotion networks in the brain and decreased activation of brain areas associated with voluntary control (e.g. orbital-frontal cortex) (Schulze et al., 2011). Although this research suggests that the process of reappraisal may be different in individuals with high levels of BPF it gives no indication as to whether or not these individuals attempt to use helpful strategies, such as reappraisal in their everyday lives.

The present study explored the emotion regulation process from the perspective of the individual allowing discussion of a full range of helpful and unhelpful strategies for the regulation of positive and negative emotions and making original and valuable contribution to the literature. This study has addressed past methodological limitations by using semi-structured interviews to allow individuals to freely express any type of emotion regulation strategies they use for positive or negative emotion regulation, and the target of their emotion regulation attempt. As a result of a lack of research

exploring these factors in relation to BPF this study was considered to be exploratory in nature and no specific hypotheses were proposed. However, it was anticipated that consistent with the available literature individuals with high levels of BPF may tend to describe the use of more unhelpful emotion regulation strategies.

### **4.3. Method**

#### **4.3.1. Participants**

The issue of sample size has been much debated in the field of qualitative, interview based research and the resounding conclusion seems to be ‘it depends’ (Baker & Edwards, 2012). In the current study the sample size ‘depended’ on several factors. Firstly, as this study proposed to draw comparisons between individuals with high levels of BPF and those with low levels of BPF, equal numbers of individuals falling into each of these categories was a consideration throughout the recruitment process. Monitoring of this information was conducted by an independent researcher to ensure the primary researcher, and author of this thesis, remained blind to the classification of participants during initial analysis. Secondly, it was important to ensure that enough participants were included to allow patterns to be identified across participants. There is no definite answer as to how many participants are required to identify a pattern in the dataset. This was a subjective judgement made by the author of this thesis and supervisory team and recruitment was ended when the author felt that no new patterns were being identified in new data and approximately equal high and low BPF participants were included.

A sample of 29 ( $n=16$  female,  $n= 13$  male) participants were recruited from a university student population in the northwest of England. The sample age ranged from 18 to 46 ( $M = 24.62$ ;  $SD= 6.90$ ). All participants were enrolled on higher education courses.

#### **4.3.2. Materials**

##### *Interview topic guide*

A topic guide was developed to direct conversation toward areas of interest. The main purpose of the topic guide was to encourage conversation about emotional experiences and how individuals attempt to regulate their emotions. Four lead questions were used each followed by a series of possible prompts to promote further discussion.

1) *‘What does the term emotion mean to you?’* Prompts focused on encouraging individuals to think about different types of emotions and to compare emotions to encourage more detailed information on their emotional experiences.

2) *‘Do you think humans have the ability to influence their emotions?’* Prompts encouraged discussion about the individual’s perceived control over emotions.

3) *‘Can you tell me about a time when you have tried to influence your emotions?’* This question was designed to encourage discussion about techniques used by the individual to regulate their own emotions. Prompts following this question encouraged participants to consider positive and negative emotions and the specific actions they take to influence their emotions. Where possible participants were encouraged to provide examples of the situations and the strategies they used.

4) *‘Did that work for you/ how do you know that that strategy was effective?’* This encouraged discussion of the perceived effectiveness of strategies and reasons for their use. It also provided an opportunity for difficulties in emotion regulation to be discussed.

##### *Self-report measures*

As discussed in chapter 3 two self-report questionnaires were used to assess the presence of BPF and their scores aggregated (Rushton et al., 1983). This meant that individuals needed to score above the cut-off score on both measures in order to be

included in the high BPF group. Participants scoring below the cut off on one or both of the self-report measures were considered to demonstrate low-level BPF (Overholser, 1992). The rationale for selection and psychometric properties of the measures included in this study has been discussed at length in chapter 3. As a result in this section only limited descriptive information regarding the measures is presented to avoid repetition. The reader may refer back to chapter 3 for further details.

*Personality Assessment Inventory – Borderline Scales (PAI-BOR; Morey, 1991)*

The 24-item PAI-BOR scale was taken from the larger 344 item personality assessment inventory; designed to assess personality pathology according to DSM-IV diagnostic criteria (Morey, 1991). The PAI-BOR scale was used assess the presence of BPF in this sample. PAI-BOR scores >38 have been found to indicate the presence of BPF (Trull, 1995). This was used as the threshold for high BPF in this study.

*Personality Diagnostic Questionnaire-4 Borderline Scale (PDQ-BOR; Hyler, 1994)*

The PDQ4-BOR was taken from the larger personality diagnostic questionnaire-fourth edition (Hyler, 1994); a 99-item self-report screening measure based on criteria for personality disorder according to the DSM-IV (APA, 2000). The PDQ-BOR contains 9-items designed to screen for the presence of BPF. A score >5 indicates clinically significant levels of BPF (Johnson & Bornstein, 1992), is consistent with DSM-IV scoring (American Psychiatric Association, 2000) and was therefore used in this study. In addition subscales for other cluster B personality features; antisocial, histrionic and narcissistic, were also included to allow exploration of the specificity of study findings to BPF.

*Center for Epidemiology Studies-Depression Scale (CES-D; Radloff, 1977)*

The CES-D is a short 20-item self-report questionnaire designed to measure depression symptoms in the general population. This questionnaire was used to assess levels of depression because BPF is highly co-morbid with mood disorder (Grant et al., 2008).

*Positive and Negative Affect Schedules (PANAS; Watson, Clark, & Tellegen, 1988)*

The PANAS consist of two 10-item subscales: positive affect and negative affect. The PANAS was used to assess current affective state at the time of interviews.

#### **4.3.3. Procedure**

Ethical approval was obtained from the University ethics committee for Psychology and Social Work. Participants were recruited from the student population at the university. In order to maximise the number of participants likely to demonstrate high levels of BPF a targeted recruitment approach was adopted, as described in chapter 3. Participation was voluntary. Participants were taken to a quiet interview room and asked to complete the PANAS self-report questionnaire to assess current affect at the time of the interview. Participants then took part in the semi-structured interview lasting approximately 30-45 minutes, which was audio recorded to allow transcription and analysis at a later date. Finally participants were asked to complete a set of questionnaires which included the personality and depression assessments.

#### **4.3.4. Data Analysis**

Thematic analysis was conducted based on procedures outlined by Braun and Clarke (2006). Familiarisation with the data were achieved through transcription of all interview recordings by the primary researcher and listening to interview recordings twice, prior to formal coding. Each transcript then underwent sentence-by-sentence coding. This process was conducted blind to BPF classification, i.e. whether the

transcripts belonged to the high or low BPF group, to avoid bias in coding. Initial coding was conducted in detail, in many cases codes were literal descriptions of the data (i.e. distracts self from unwanted thoughts). This was to ensure that nothing was missed that may later develop into a theme. The initial codes were then refined and collated across transcripts into broad themes. Each theme underwent further analysis, grouping together similar themes and reviewing coding as new themes emerged. This stage of analysis was conducted on the full dataset regardless of BPF classification to avoid bias in coding. To ensure scientific rigour 10% of the transcripts were also coded by another researcher experienced in this type of analysis; codes were then compared, amended and discussed until agreement was reached (Frommer & Rennie, 2001).

#### **4.4. Results**

##### **4.4.1. Sample groupings**

For the purpose of this study participants scoring  $>5$  on the personality diagnostic questionnaire *and*  $> 38$  on the personality assessment inventory were classified as high BPF. Therefore individuals scoring below the cut off on one or both of these questionnaires were classified as low BPF. Six participants were found to score above the cut off on only one measure and thus were included in the low BPF group; one of these participants scored above the cut off for the PDQ only and five scored above the cut-off on the PAI only. This led to  $n=16$  participants in the low BPF group ( $n= 8$  Male,  $n= 8$  Female) and  $n=13$  in the high BPF group ( $n=5$  Male,  $n=8$  female). There were no significant differences in BPF grouping across gender ( $X^2 (1) =.39$ ,  $p=.534$ ). Means and standard deviations of age, current affect, depression, and cluster B personality scores were computed for each group to examine homogeneity of these variables across groups (Table. 4.1). The group means indicate that age, current affect, depression and cluster B personality scores are comparable between the two groups and

therefore it is unlikely that any differences identified in qualitative analyses are attributable to these factors.

Table 4.1 Means and Standard Deviations by BPF Grouping for Age, Current Affect, Depression and Borderline Personality Scores.

	Low BPF Group		High BPF Group	
	Mean	S.D	Mean	S.D
Age	25.88	6.69	23.08	7.10
Positive affect	30.25	6.69	29.92	4.46
Negative affect	14.31	3.46	16.77	5.29
Depression	23.19	10.26	22.69	11.84
PDQ-Antisocial	2.31	1.85	2.46	1.39
PDQ-Histrionic	3.31	1.85	2.15	1.28
PDQ-Narcissistic	2.31	1.92	1.61	1.04
PDQ-Borderline	3.31	1.19	6.46	1.33
PAI-Borderline	34.40	6.91	48.62	7.84



#### 4.4.2. Thematic analysis

Several themes emerged from the dataset, some of which were beyond the scope of the research questions. Therefore only themes relating to the topic of emotion regulation underwent further analysis. In order to explore similarities and differences in the experiences of individuals with high versus low levels of BPF, the evidence in each theme was split according to BPF classification. Analysis continued, to identify similarities and differences between the two classifications. At this stage analysis progressed from description of the data to interpretation, where an attempt was made to theorise the significance of the differences and their broader meanings (Patton, 2002).

There were four themes identified in the dataset. These were: type of emotion regulation strategy, immediate vs. long term emotion regulation, difficulty maintaining positive focus, and communication of negative emotion. Each of these themes is discussed with supporting evidence below; highlighting similarities and differences between high and low BPF individuals within each theme.

##### *Theme I: Type of emotion regulation strategies*

Each transcript provided descriptions of different ways in which the individuals attempt to alter their emotions. Across all transcripts the primary purpose was to maximise the experience of positive emotions and minimise negative emotions, for example, *'I think everybody should really aim towards being happy because to live a good life you have got to be happy. You know if you are unhappy with your life it's, err, it's hard to deal with' (P25)*<sup>2</sup>. Strategies reported for the regulation of positive emotion regulation and negative emotion regulation were analysed separately. Across the full dataset four types of strategy were identified for positive emotion regulation and seven types of strategy were identified for negative emotion regulation. Definitions of each

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<sup>2</sup> All participant numbers have been changed to preserve anonymity.

strategy and supporting evidence for positive and negative emotion regulation can be found in Table 4.2 and Table 4.3 respectively. When looking at strategies for positive emotion regulation (Table 4.2), it can be seen that evidence for each type of strategy came from both the high and low BPF group. However, a higher proportion of individuals from the low BPF group provided evidence of using each of the strategies identified. When looking at strategies for negative emotion regulation (Table 4.3), it can be seen that there are roughly equal percentages of the high and low BPF participant describing each strategy except for: 1) Problem solving, for which a relatively smaller proportion of the high BPF group describe using and 2) Suppression, for which a relatively higher proportion of the high BPF group described using.

#### *Theme II: Perception of Emotion*

In each transcript there was discussion of what the individual perceived emotion to be. This was mainly driven by question one of the topic guide. However, some evidence for this theme also came from responses to question 4. There were five major topics identified within this theme: emotion as physiological response, emotion as behavioural response, emotion as subjective response, emotion as cognition and difficulty in defining emotion. Definitions, evidence and the source of evidence for each of these subthemes can be found in Table 4.4. Looking at the percentages of high and low BPF transcripts from which evidence for each theme was taken, there are no apparent differences in the way individuals with high and low levels of BPF conceptualise emotion. Further to this, these subthemes of *perceptions of emotion* are not exclusive from each other: all bar one participant provided evidence for more than one subtheme. In fact 62% of participants in the high BPF group and 38% demonstrated evidence for all of the subthemes (excluding difficulty with describing emotion). The higher percentage of participants in the BPF demonstrating evidence for all subthemes may be taken as an indication that individuals scoring highly in BPF may

be more likely to perceive emotion as a full-system response including: physiology, behaviour, subjective experience and cognitions. This may be taken an indication that when high BPF attempt to regulate emotion they are more likely to be aiming for a change in multiple response systems.

Table 4.2. Strategies Identified for the Regulation of Positive Emotion across the Full Dataset

Strategy	Operational definition	Example	Evidence source*
Situation selection	Choosing or changing a situation to initiate or maintain a positive emotion.	<i>'I try to fill my time with things that make me happy.'</i> (P14)	H=61.52%, L=68.75 %
Directed attention	Choosing to focus attention in order to embrace current past or future positive emotion.	<i>'I sometimes tell myself how happy I am and how lucky I am to have the things I have so I kinda like it makes me more happy.'</i> (P8)	H=38.46%, L=56.25%
Substance use	The use of substances (e.g. food, caffeine, alcohol, cannabis) to initiate or enhance positive emotion.	<i>'...like playing games in particular is enhanced by smoking weed because it makes you worse and that makes it funnier.'</i> (P14)	H=7.69%, L=18.75%
Passive	No explicit action taken to alter positive emotion.	<i>'Yeah I don't know happiness I have never I don't really seem to think about happy as much as I do try to get rid of negative.'</i> (P20)	H=30.77%, L=37.50%

*Note:*\*Indicates the number of high (H) out of n=13 and low (L) out of n=16 BPF transcripts that provide evidence for each strategy.

Table 4.3 Strategies for the Regulation of Negative Emotions Identified across the Full Dataset.

ER strategy	Definition	Example	Evidence source*
Problem solve	Taking action to attempt to alter an emotion eliciting situation in order to change its emotional impact.	<i>'The last few years of my marriage I was sad that the situation had got where it had.....I tried to make recompense and save the marriage...'</i> (P30)	H=46.15%, L=62.50%
Avoidance	The deliberate attempt to avoid an emotion or situation causing emotion by removal of self, deployment of attention, or emotion escape via substance use.	<i>'If I get like really angry like for example in a dispute or argument with a certain person I will prefer to just walk away...'</i> (P15)	H=100%, L=100%
Emotional Expression	The deliberate outward projection of emotion via emotional behaviour, physical exercise or verbal communication.	<i>'You feel like the need to express it so for me I for me I would say something to the person that had frustrated me.'</i> (P18)	H=84.62, L=87.50%
Emotion Suppression	The effortful action of hiding behavioural displays of internal emotional states from others.	<i>'I tried to hide it [sadness]. Just I dunno I was trying to be strong.'</i> (P20)	H=46.15%, L=37.50%

Rumination	A persistent focus on past negative situations and negative aspects of self and on their possible causes and negative consequences.	<i>'I just get angry and I don't know, just keep thinking about it again and again, it's kinda like trying to find a solution to a possible problem.'</i> (P8)	H=46.15%, L=50%
Reappraisal	Deliberately changing how one thinks about an emotional situation (in the presence of emotion) to alter its emotional impact.	<i>'I did look on the bright side of it, to know that they weren't in pain any more, to know that they weren't hurting. So I was thankful for that.'</i> (P9)	H=92.31%, L=93.75%
Acceptance/ passive/ helpless	The awareness of an emotion whilst making no conscious effort to influence it.	<i>'I don't tend to [regulate negative emotions] I just wait until something better comes along.'</i> (P19)	H=46.15%, L=50%

*Note:* \*Indicates the percentage of transcripts from the high (H) and low (L) BPF groups that provide evidence for each strategy.

Table 4.4. Perceptions of Emotion Identified Across the Full Dataset

	Definition	Evidence	Source
Physiological Response	Participants describe Emotions/awareness of emotions in physiological terms.	<i>'Erm just some physical signs like sweating dry mouth, heart beating fast, physical things like that like where your hands might get clammy or if you are annoyed you will start to get red in the face and more testosterone pumping through you, so you feel like you are, if you are angry.'</i> (P3)	H=84.62%, L=75.00%
Subjective Feeling	Participants describe emotion as an overall personal experience.	<i>'Emotion is the feelings that we have.'</i> (P15)	H=92.30%, L=100%
Behaviour	Participants describe emotion/awareness of emotions using behaviours.	<i>'I suppose the obvious one is if you are laughing you are probably you find something amusing you are happy, if you are crying you are sad.'</i> (p19)	H=100.00%, L=75.00%
Cognition	Participants describe emotions as a shift in thinking or motivation.	<i>'I mean I know that I am angry because it just plays on my mind whatever just happened.'</i> (P127)	L=75.00% H=84.62%
Difficulty describing emotion	Participants demonstrate difficulties in describing emotion.	<i>'Erm... [pause] ...sort of the overall feel of kind of how... [pause] ...again perhaps I'm not that good at describing my emotions possibly erm... [pause] ...certainly sort of say id use a lot of language that err very broad description maybe.'</i> (p10)	H=38.46% L=37.50%

Note: \*Indicates the % of transcripts from the high (H) and low (L) BPF groups that provide evidence for each strategy.

### *Theme III: Immediate vs. long term emotion regulation.*

High BPF participants described using techniques that led to immediate changes in unwanted emotion, despite showing awareness that these strategies may have unhelpful long term consequences, for example, *'I do, I know I shouldn't do this one but I do just go out and spend a lot of money and that changes the way I feel. Like say if I am really mad about something I will just bugger off and buy loads of weird things and then come home with them and then I don't even know why I have got them. But that is good for me because I do feel happy once I have done it. I come home and I do feel very happy (laughs) but then I am like why have I just spent all of my money, what am I going to do now?'* (P23).

Low BPF participants also described taking action to cause immediate changes to unwanted emotion but also demonstrated consideration of how to make changes to emotion long term, for example *'so... I will think how can I cure that emotion? How can I cure that emotion? How can I stop it? It's like well what can I do to make sure that doesn't happen again?'* (P36). This long term consideration was absent in transcripts from most high BPF participants.

### *Theme IV: Difficulty maintaining positive focus*

High BPF participants demonstrated difficulties with maintaining attention on positive events and experiences. In descriptions of positive emotion regulation this was evidenced by descriptions of problems maintaining focus on the current positive event; instead being distracted by unrelated negative situations, for example, *'Yes when I am in situation where I feel like the happiest person in the world I still have those negative thoughts that should be at the back of your mind but they are at the forefront and I am constantly just telling myself just take it all in at this moment in time so that you can think back on it later and remind yourself that this is what happiness feels like.'* (P26). Alternatively some high BPF participants demonstrate a focus on negative elements



within the positive situation, for example, *'I think a lot of the time when I do [try to increase positive emotions], it doesn't really work. I think if I plan something and think oh this will be great and y'know plan a day and think I'm going to really enjoy this- already it's like not going to meet that expectation so I find that quite hard. I mean obviously I do plan things that I hope I will enjoy.'* (P11). Here the focus is on where the positive experience has fallen short of expectations rather than the positive experience itself.

Difficulty in maintaining a focus on positive experiences and events was also demonstrated in high BPF descriptions of negative emotion regulation. This impacted on reappraisal abilities with reappraisal attempts turning into rumination, for example, *'No, so for quite a long time I really, really, really resented my parents for doing that. I mean I went to university and I went abroad and I met a lot of people that are very special in my life and you realise that if things were different then you wouldn't have been meeting these people..... and it sort of allowed me to let go of the resentment for my parents. But you know that you don't want things to have changed, but on another level you are so aware, you are very aware that your parents are the type of people that did this, and that you can't turn to them for support and that you have to be independent and that I am very much sort of on my own in this.'* (P14).

#### *Theme V: Communication of negative feelings*

Both high and low BPF participants described expressing negative emotion in order to gain an emotional release. For example a participant in the low group stated: *'it's just an offload isn't it - it's just offloading to someone you know or just, it's just erm yeah you are just getting it out of your head aren't you, the idea is that if you get it out of there and into there then it's not in here anymore'* (P13) and a participant from the high group stated: *'So to be able to do that would probably make me feel better I think, at least while I was doing it; it would be like a release of emotion.'* (P14).

However, high BPF participants also describe emotion expression in order to communicate their negative emotion with others, for example, *'that [throwing an object at another person] was just to stop her, just to make her see that I was suffering and to just y'know even any reaction.'* (P14) and *'I think when you get sort of a reaction a lot of the time like if somebody says something that annoys me or upsets me once I have got a reaction out of them even if the reaction is not nice to me I feel like I have achieved it and then I can move on from that emotion and think about something else.'* (P11). Here, the goal of the emotion expression is to get the emotion acknowledged by another individual.

#### **4.5. Summary of Key Findings**

The results suggest that all participants viewed emotion as a multi-component response, describing emotion in terms of physiology, behaviour, feelings and thoughts. However a higher percentage of individuals from the high BPF group described emotion in terms of *all* of these components, suggesting that this group may view emotions as more of a full system response. When discussing emotion regulation, both the high and low BPF group described using a range of emotion regulation strategies including strategies considered to be helpful and unhelpful in the regulation of both positive and negative emotions. Despite this the function of one strategy, emotion expression, appeared to vary between the high and low BPF groups. More specifically, although both groups describe using emotion expression as a release, individuals in the high BPF group also described using emotion expression to communicate internal negative experiences. In addition, individuals in the high BPF group also described difficulty in maintaining focus on positive experiences. This was apparent during attempts to describe both positive and negative emotion regulation attempts. Finally, the high BPF group described regulating emotions for immediate relief rather than long

term benefits, despite awareness of potential unhelpful long term consequences of their actions.

#### **4.6. Discussion**

Little research has explored how individuals with high levels of BPF attempt to regulate their emotions during their everyday lives. This study used qualitative methodology to explore if individuals with high versus low levels of BPF differ in the strategies used and experiences of emotion regulation. Findings from the present study indicate that there is little difference in the *types* of strategies used by high and low BPF participants, with evidence for all strategies from both the high and low BPF groups. This suggests that individuals with high levels of BPF demonstrate knowledge of a wide range of emotion regulation strategies and make attempts to use these strategies in everyday situations. This is consistent with past research findings in clinical populations, which suggests that individuals with a diagnosis of borderline personality disorder have sufficient knowledge of emotion regulation strategies (Beblo et al., 2010). Findings from the current study also show that individuals with high levels of BPF use a range of strategies in everyday situations including those considered to be helpful (e.g. reappraisal) and unhelpful (e.g. suppression or rumination). This is in contrast to current literature, which reports the use of unhelpful strategies within this population (e.g. Brown et al., 2002; Conklin et al., 2006; Rosenthal, Cheavens, Lejuez, & Lynch, 2005). One explanation for this contrast in findings is the primary focus in past research on the use of unhelpful emotion regulation strategies such as rumination, suppression and self blame, without assessing the use of more helpful strategies such as reappraisal or situation modification. This may have resulted in a biased account of the type of emotion regulation strategies used within this population, over emphasising the use of unhelpful strategies. Alternatively, it may be that these individuals use a range of helpful and unhelpful strategies to regulate their emotions, as indicated in this study, but

choose to use more unhelpful strategies and less helpful strategies. Qualitative data from the current study only indicate that these individuals are able to recall a time when they have used several different helpful emotion regulation strategies. This shows that the individual has knowledge of the strategy and has attempted to use it, but does not indicate how frequently the strategy is used in everyday life. As a result it is possible that individuals with high versus low levels of BPF may differ in the extent to which they use helpful and unhelpful strategies.

In addition both groups were able to provide descriptive examples of when they have employed emotion regulation strategies, suggesting that individuals with high levels of BPF do make active attempts to alter their own emotions. This is in spite of the presence of low emotion regulation self-efficacy reported in previous research (Salsman & Linehan, 2012). However, as the qualitative data focused on descriptive accounts of isolated emotion regulation examples it is difficult to determine how often these behaviours would occur in everyday life. Therefore it is possible that although individuals with high levels of BPF do make some active attempts to regulate their emotions, it is still possible that these attempts are made less often.

Similarities between the high and low BPF group were also identified in how they describe emotion. Across the dataset emotions were defined in terms of behaviour, experience, physiological changes and thoughts. This is consistent with theoretical conceptualisations of emotion as multi-component responses (Frijda, 2013; Gross, 2013; Lazarus, 1991; Scherer, 2013). Further analysis of the data revealed that all but one of the participants from the entire dataset demonstrated evidence for more than one subtheme, with the majority of individuals demonstrating evidence for all subthemes, excluding difficulty in describing emotion. It is interesting to note that a larger proportion of the low BPF group were found to provide evidence for all subthemes, when compared to the high BPF group. This may be indicative that individuals with

high levels of BPF are more likely to perceive emotions as full system responses. This may be of particular importance when evaluating emotion regulation success. Past research has found that different types of emotion regulation strategy have different impacts depending on the type of emotional response being investigated e.g. experiential, behavioural, physiological (Webb et al., 2012). If individuals with high levels of BPF, relative to low levels of BPF, are more likely to consider all types of emotional response as central to an emotion episode, it may be that emotion regulation attempts that are only effective for one or two of these responses may be perceived as unsuccessful. However, the qualitative methodology used does not allow investigations into the significance of this difference. Therefore, this topic would benefit from future quantitative research to explore differences in emotion perception between individuals with high and low BPF features.

Despite similarities in the types of strategies and emotion regulation targets described by high and low BPF participants, several differences were identified in the thought processes leading up to strategy use and in experiences of using the strategies. Whilst both groups of participants sought immediate change for unwanted emotions, the low BPF group also sought to prevent unwanted emotional states in the future. This consideration of future emotional responses is illustrative of antecedent-focused emotion regulation, which has previously been reported as more effective (Gross, 1998a). The lack of consideration for future unwanted emotion in the high BPF group may be explained by the low tolerance for distress previously identified in this population (Gratz et al., 2006). Focusing attention on unwanted emotion may cause mild distress therefore individuals with high levels of BPF may be unwilling to experience this distress in order to achieve long term emotion regulation.

Findings from the present study also demonstrate that many of the high BPF group demonstrated difficulty regulating emotion due to problems with diverting

attention away from negative and towards positive emotional stimuli. This finding is consistent with past experimental research, which showed that individuals with a diagnosis of BPD demonstrate deficits in attentional control and the inhibition of irrelevant aversive information (Silbersweig et al., 2007). Similarly, the Emotional Cascade Model suggests that individuals with high levels of BPF may experience difficulty in diverting their attention away from intense negative emotion, which leads to the use of extreme forms of distraction such as deliberate self-injury (Selby & Joiner, 2009). Findings from the current study are illustrative of this hypothesised internal battle to divert attention away from ruminative thoughts. The ability to divert attention away from unwanted negative emotional stimuli and toward positive stimuli has been identified as a key process in effective emotion regulation to reduce unwanted negative emotions and maintain or enhance positive emotions (Bryant, 1989; Gottman & Katz, 1989; Gross & Thompson, 2007; Gross, 1998a; Linehan, 1993). The inability to do this is therefore likely to lead to emotion regulation problems and result in high levels of negative emotion and low levels of positive emotion, a pattern of emotional experience associated with high levels of BPF (Ebner-Priemer et al., 2007). Therefore it appears that difficulties in attentional control and shifting may be a causal factor in emotion regulation problems within high BPF populations.

Finally, transcripts revealed different thought processes underlying the use of emotion expression as a regulation strategy. When using emotion expression both high and low BPF participants describe the need for a release of emotion. However, in addition to this a number of high BPF participants describe the need to communicate their negative emotion with others. This is consistent with past literature on self-injury, suggesting that individuals with a diagnosis of borderline personality disorder may engage in self-injury behaviour in order to reduce negative emotional states, express emotion and to communicate distress with others (Paris, 2005). This need for

acknowledgement from others for internal emotional states may be associated with the idea of invalidation of internal emotional experiences during childhood (Linehan, 1993). An invalidating environment during childhood may have prevented learning of self-validation of emotional states in adulthood. Thus the individual continues to seek external validation for internal emotional states. The use of emotion expression in order to obtain emotional validation from others may lead to intense displays of emotional behaviour and may contribute to interpersonal problems, another key borderline personality feature.

It is acknowledged that the current study has some limitations. Firstly, as is typical for qualitative research studies sample size is small. As a result, the ability of these findings to be generalised is more limited, yet small samples of this nature allow for a richness of data. Moreover, the current study could not control for the presence of other cluster B personality disorder traits. Therefore it cannot be assumed from this sample that findings are specific to BPF. However, the presence of personality features associated with other cluster B personality disorders were assessed and found to be comparable across the high and low BPF groups. This means that it is unlikely that the differences between the two groups resulted from the presence of more cluster B personality features.

Secondly, there were small differences in the percentages of high and low BPF individuals reporting different strategies, however, due to the qualitative nature of this study it is difficult to establish whether or not these differences are meaningful. In line with this findings from the current study do not indicate to what extent each of the different strategies was used. For example it may be that individuals with high levels of BPF do use all types of strategy but they may use some more than others. As a result further research is required to explore the relationship between BPF and types of emotion regulation strategies used, this is explored in study 2a of this thesis.

Thirdly, the self-report nature of this dataset suggests that emotion regulation attempts described were explicit (conscious and effortful) attempts to alter emotional states. However, some of these attempts may have been conducted implicitly at the time and are brought into explicit awareness only on reflection. Likewise there may be some strategies that are implemented completely outside of conscious awareness (Gyurak et al., 2011) and as such would not have been reported at all during interviews. Therefore finding from the current study may not represent all of the strategies that are used by these individuals. In addition due to the self-report nature of this investigation it may be that the strategies reported are somewhat idealised accounts of how the individual regulates their emotions. In order to minimise this participants were asked to report how they actually regulate their emotions rather than how they think emotions could or should be regulated. Further to this participants were asked to provide real life examples of where situations had been used. In future research a combination of self-report and observation data may be useful to clarify the types of strategies actually implemented.

Finally due to the qualitative nature of this research it was not possible to quantify emotional experiences described. This means that although high and low BPF participants may describe using the same strategies to regulate their emotions, the experiences of emotion themselves may have differed in intensity. As past research has indicated that emotional intensity may impact on the success of certain high processing emotion regulation strategies (Sheppes et al., 2009; Sheppes & Meiran, 2007, 2008). This warrants further investigation and is further explored in study 2b of this thesis.

Notwithstanding the aforementioned limitations, current findings build upon Linehan's theory to provide an insight into what it is about emotion regulation attempts made by individuals with high levels of BPF that makes them less successful. Firstly, it has been found, in this non-clinical population, that individuals with high levels of BPF



utilise a range of emotion regulation strategies consistent with individuals reporting low levels of BPF. This suggests that although unhelpful strategies may be used by individuals with high levels of BPF, their use is not specific to individuals with high levels of BPF and thus is unlikely to be solely responsible for the emotion regulation problems in this population. Secondly, at the time of writing and to the best of the author's knowledge, this study is the first to provide evidence to suggest that individuals with high levels of BPF may differ in their perceptions of the emotion construct. This suggests that emotion regulation difficulty in this population may be a problem of unrealistic expectations of emotion regulation rather than the emotion regulation processes itself. Although this finding is preliminary, future research in this area may help to improve understanding of how individuals with high and low levels of BPF differ in their experience of emotion and expectations of emotion regulation. Thirdly, it appears that, consistent with the process model of emotion regulation, a *lack of planning* in emotion regulatory behaviour may contribute to emotion regulation problems associated with BPF. In addition, differences in purpose of emotion regulation attempts e.g. to *communicate internal negative experiences*, may be associated with other features of BPF such as interpersonal problems. Finally, deficits in attentional control skills may make it difficult for individuals to utilise some helpful emotion regulation strategies, despite attempts to do so.

These findings highlight factors that may contribute to the difficulties in emotion regulation associated with the presence of BPF. This may have implications for emotional support services both in the community and educational settings by highlighting potential targets for intervention in order to support individuals in learning to better manage their emotions. For example, findings suggest that individuals with high levels of BPF may engage in extreme behaviour in order to communicate internal emotional experiences with others. Therefore it may be beneficial for these individuals

to receive support in learning new and more helpful ways of communicating internal emotional experiences. Similarly, findings indicate that a negative attention bias and a need for immediate relief may create difficulty in emotion regulation for these individuals. This finding supports the use of mindfulness techniques, which are already a key part of clinical interventions for BPD (Linehan, Bohus, & Lynch, 2010), to facilitate the consideration of both positive and negative aspects of a situation without judgement. In addition these individuals may benefit from direct support to reduce negative attentional biases, such as cognitive bias modification programs for attention (Carl, Soskin, Kerns, & Barlow, 2013; Grafton, Ang, & Macleod, 2012). The use of these techniques in non-clinical emotional support services within educational and community settings may prevent emerging BPF in young adults from developing into stable and problematic personality traits.

## **Chapter 5 – Study 2a: Quantifying the Use of Different types of Emotion Regulation Strategies in Relation to Borderline Personality Features**

### **5.1. Abstract**

This study aimed to investigate the relationship between borderline personality features (BPF) and the number and type of emotion regulation strategies used during the regulation of positive and negative emotions. This was achieved using a predominantly female sample of 100 university students. Participants were asked to complete a series of self-report measures to assess personality, mood disturbance and emotion regulation. Hierarchical multiple regression analyses were used to explore the relationship between BPF and the type and number of emotion regulation strategies reported after controlling for demographics, mood disturbance and other cluster B personality features. Strategies for the regulation of positive and negative emotions were analysed separately. It was found that BPF score was not predictive of the type or number of strategies used during positive emotion regulation, nor did it predict the number of strategies used for negative emotion regulation. However, findings suggest that individuals with high levels of BPF were more likely to report using unhelpful strategies and less likely to report using helpful strategies when regulating negative emotions.

## 5.2. Introduction

Emotion regulation is defined as an individual's ability to choose what emotions they have, when they have them and how they experience, and express these emotions (Gross et al., 2006). Leading on from this, the term *emotion regulation strategies* refers to the mental or behavioural processes that individuals use in order to influence emotional experiences, behaviour or physiological responses. In this chapter the focus is on explicit emotion regulation attempts, that is, deliberate conscious and monitored attempts to influence emotion. However, it is acknowledged that not all emotion regulation processes are conducted explicitly (e.g. Koole & Rothermund, 2011; Mauss, Bunge, et al., 2007); a review and investigation of implicit emotion regulation processes is included in chapter 7 of this thesis.

It is well recognised within the emotion regulation literature that the types of strategies used by individuals to regulate their emotions can have important consequences for emotion regulation success. The majority of this research has been based upon the process model of emotion regulation (Gross & Thompson, 2007; Gross, 1998a), discussed in chapter 2. The process model of emotion regulation suggests that all emotion regulation strategies can be grouped into five families according to when in the process of emotion generation they have their primary impact. The five families of emotion regulation strategies are situation selection, situation modification, attention reorientation, cognitive change and response modulation. Definitions for each emotion regulation family can be found in Figure 2.3.

A meta-analysis of 190 studies was conducted to explore the effectiveness of different types of emotion regulation strategies derived from Gross's (1998a) process model of emotion regulation (Webb et al., 2012). Findings indicated significant differences in the effectiveness of different families of strategies. Overall cognitive

change was significantly more effective than response modulation, which in turn was more effective than attention re-orientation. This demonstrates that strategies from different emotion regulation strategy families, identified in the process model of emotion regulation, have different outcomes for emotion regulation success. However, it was also found that there are significant differences within families, between different types of strategy. For example, both distraction and concentration are attention re-orientation strategies but they were found to differ significantly from each other in their effects on emotion regulation success; distraction was effective whilst concentration was not. This demonstrates that the type of strategy used can have a significant impact on emotion regulation success. Finally it was found that the type of emotion, positive or negative, had a significant impact on emotion regulation success, with larger effects being seen for positive emotions (Webb et al, 2012). This highlights the importance of investigating both positive and negative emotion regulation individually.

In addition to strategy type, research has indicated that the number of emotion regulation strategies used during an emotion regulation episode may also influence emotion regulation success. Aldao and Nolen-Hoeksema (2013) explored the impact of the number of emotion regulation strategies used during the regulation of the negative emotion of disgust. It was found that the majority of individuals use more than one strategy during an emotion regulation episode. Further to this, individuals using only one strategy used it to a greater extent than those using multiple strategies, suggesting that individuals choosing only one strategy implemented it for a longer period of time than those using multiple strategies. Individuals that reported using multiple emotion regulation strategies also reported higher negative emotion intensity, suggesting poorer emotion regulation success (Webb et al., 2012). This suggests that the number of strategies used and the duration of strategy use may be important factors in determining emotion regulation success.

Research has begun to explore the types of strategies used by individuals with a diagnosis of BPD, and therefore extreme levels of BPF, as a potential mechanism for emotion dysregulation associated with this population. For example Conklin et al (2006) compared the emotion regulation strategies used by individuals with a diagnosis of BPD to those with a diagnosis of dysphoric disorder using ratings from un-blinded clinicians. It was reported that individuals with BPD used more unhelpful emotion regulation strategies than those with dysphoric disorder. However, the validity of this study is compromised due to the use of ratings from un-blinded clinicians, thus allowing for biased responses being made according to the diagnosis of the patient being rated. In addition, this study had a predominant focus on unhelpful strategies, with four out of five of the strategies being investigated considered as unhelpful. This is a problem that can be seen across the BPF literature with studies focusing on the use of unhelpful emotion regulation strategies such as rumination and self-harm (e.g. Brown et al., 2002; Selby et al., 2009), ignoring the potential for helpful strategies to also be used within this population. The understanding the use of helpful strategies within this population is important as these skills may built upon during treatment. Further, if these individuals are using helpful strategies then understanding when these strategies are likely to be selected over unhelpful strategies may highlight important protective factors that can be capitalised on during treatment.

In addition to focusing on unhelpful strategies past research has focused on the regulation of negative emotions, ignoring the process of positive emotion regulation. Individuals with high levels of BPF have been repeatedly found to experience low levels of positive emotion (Ebner-Priemer et al., 2007; Zeigler-Hill & Abraham, 2006). Further, a lack of positive emotions and cognitions has been found to discriminate individuals with BPD from those with other personality disorders (Reed & Zanarini, 2011). Consistent with biosocial theory (Linehan, 1993), this indicates that positive

emotion regulation processes may also be disturbed in this population. Despite this, research exploring positive emotion regulation in relation to BPF is sparse and to date the relationship between the types of strategies used for positive emotion regulation and BPF has not been explored.

One experimental study explored the ability of individuals with high levels of BPF to use a range of strategies for the regulation of positive and negative emotions (Jacob et al., 2011). It was found that when individuals were instructed to use specific strategies, such as distracting task, individual positive memory imagery or individual soothing imagery, over a set period of time they were able to do so effectively leading to reductions in negative emotion intensity and increases in positive emotion intensity. This indicates that individuals with high levels of BPF are able to successfully use a range of strategies for positive and negative emotion regulation when instructed to do so. Yet, these individuals still appear to experience emotion regulation difficulty in everyday situations. Therefore, it may be that in real life situations, where no instructions are provided and individuals are required to decide their own strategies and duration of regulation they make inappropriate strategy choices. Alternatively, they may switch between strategies rather than using one strategy consistently, which was the case in experimental situations. This pattern of switching between strategies has previously been associated with poorer emotion regulation success (Aldao & Nolen-Hoeksema, 2013) and therefore, if this is true, it may contribute to emotion regulation problems associated with BPF.

In summary, the emotion regulation literature has highlighted the importance of strategy type and number of strategies used for emotion regulation success. Despite this there have been few studies exploring the types of strategies used by individuals with high levels of BPF/BPD for negative emotion regulation and even less for positive

emotion regulation. Research that has been conducted has had a primary focus on the use of unhelpful strategies for the regulation of negative emotions, with little consideration of helpful emotion regulation strategies that may also be used. In addition, methodological flaws are evident in many of these studies, questioning the validity of findings. The current study aimed to improve understanding of the emotion regulation strategies used by individuals with high levels of BPF by exploring the use of helpful and unhelpful strategies equally, from the perspective of the individual rather than an informant, and by looking at both negative and positive emotion regulation strategies. In addition, to the best of the author's knowledge, this is the first study to explore the number of strategies used for a single emotion regulation episode in relation to BPF. This study used self-report questionnaires of the type and number of emotion regulation strategies used for negative and positive emotion regulation episodes. Based on past research it was hypothesised that individuals with high levels of BPF would report using more unhelpful and less helpful strategies. It was also hypothesised that individuals with high levels of BPF may use more strategies per emotion episode.

### **5.3. Method**

#### **5.3.1. Participants**

In order to calculate the sample size required for adequately powered analyses a priori power analysis hierarchical multiple regression was conducted. Using  $\alpha$  level of .05,  $\beta$  of .95 and the expected effect size of  $f^2=.15$ . The calculated required sample size was 94. Participants were recruited from a university student population as part of a larger study using a targeted recruitment approach, which has been discussed in Chapter 3. This approach resulted in the initial recruitment of 112 participants into the study, of these 12 participants failed to return to complete phase 2 of the study. This was taken to indicate withdrawal and all data for these participants were removed from the dataset. This resulted in data from 100 participants (mean age =22.30 SD=5.66), n=20 males



(mean age=22.25, SD=6.11) and n=80 females (mean age= 22.32, SD=5.54) to be included in analyses for study2a. This sample was predominantly white British (76%). Participants were recruited from across the university and represented students from 27 different subject areas. The largest proportion was from psychology (50%) followed by neuroscience and business studies (8% each), forensic science (5%) and computing (3%). The largest proportion of participants were studying towards an undergraduate BSc/BA degree (79%) followed by MSc/MA (11%), PhD (5%) and other (5%). Participants were asked to report if they had ever received any formal support with emotion regulation: 60% reported that they had received no formal support for emotion regulation, 14% had received counselling only, 8% had received counselling in combination with medication, 3% counselling with CBT, 4% CBT only, 5% CBT with medication, 2% medication only, and 4% other psychotherapy.

Using the classification procedures outlines in study 1, 25% of the participants included in this sample scored above the threshold for high levels of BPF on both measures, 23% on one measure only and 52% scored below the threshold on both measures of BPF. Information regarding the range, mean and standard deviation of BPF scores in this sample are presented in Table 5.4.

### **5.3.2. Measures**

All measures are discussed at length in chapter 3, therefore, only limited descriptive information is provided in this section to aid clarity for the reader. For justification and psychometric properties of each measure please refer to chapter 3.

#### *Personality Assessment Inventory – Borderline Scales (PAI-BOR; Morey, 1991)*

The 24-item PAI-BOR scale was taken from the larger 344 item personality assessment inventory; designed to assess personality pathology according to DSM-IV diagnostic criteria (Morey, 1991). The PAI-BOR scale was aggregated with PDQ-BOR

scores to provide an overall score of BPF. In the current study the PAI-BOR was found to demonstrate excellent internal validity ( $\alpha=.86$ ).

*Personality Diagnostic Questionnaire-4 (PDQ-4; Hyler, 1994)*

The PDQ-4 (Hyler, 1994) is a 99-item self-report screening measure based on criteria for personality disorder according to the DSM-IV (American Psychiatric Association, 2000). Only 4 scales from the PDQ-4 were used to assess cluster B personality features: borderline scale (PDQ-BOR), anti-social scale (PDQ-AS), histrionic scale (PDQ-HIS) and narcissistic scale (PDQ-NAR). Each scale was used to assess the presence of its respective personality features. The PDQ-BOR score was aggregated with PAI-BOR to provide an overall BPF score. In the current study, although the subscale PDQ-BOR ( $\alpha=.71$ ) demonstrated good internal consistency given the low number of items, for other cluster B subscales internal consistency was poor: PDQ-AS ( $\alpha=.51$ ), PDQ-HIS ( $\alpha=.56$ ), PDQ-NAR ( $\alpha=.51$ ).

*Center for Epidemiology Studies-Depression Scale (CES-D; Radloff, 1977)*

The CES-D is a short 20-item self-report questionnaire designed to measure depression symptoms in the general population. This questionnaire was used to assess levels of depression in the sample. In the current study the CES-D was found to demonstrate excellent internal consistency ( $\alpha=.91$ ).

*Generalised Anxiety Disorder 7-item scale (GAD-7; Spitzer et al., 2006)*

The GAD-7 is a seven item screening measure for anxiety disorder which was used to assess levels of anxiety in sample. In the current study the GAD-7 was found to demonstrate excellent internal consistency ( $\alpha=.90$ ).

*Amended Emotion Regulation Profile-Revised (ERP-R; Nelis et al., 2011)*

The ERP-R is a 16-item vignette-based questionnaire, which was used to assess the use of helpful and unhelpful strategies in the regulation of both positive and negative emotions. As discussed in chapter 3, only 8 of the 16 items were included for

the purposes of this study; 4 positive emotion vignettes, 4 negative emotion vignettes. Following the vignette participants are presented with 8 responses to the situation, each response represents a different type of emotion regulation strategy (4 helpful strategies and 4 unhelpful strategies). If participants reported using a strategy it was scored as a 1 and if not it was scored as a 0. In order to explore the relationship between BPF and each emotion regulation strategy, individual strategy scores were summed across items, thus each strategy score ranged between 1 and 4. Scores of strategies considered to be helpful were then totalled and scores from unhelpful strategies were totalled. This was done separately for positive and negative emotions resulting in 4 scores each ranging from 0-16; positive helpful, positive unhelpful, negative helpful and negative unhelpful. Internal consistency for each strategy score and higher scales were calculated using Cronbach's alpha and is reported in Table 5.1. In addition to the type of strategy used, this measure was used to indicate the number of strategies an individual uses in an emotion regulation episode. Individuals are instructed to select as many strategies as apply for each vignette allowing the mean number of strategies reported for the regulation of negative and positive to be calculated for each individual.

Table 5.1. Definitions and Cronbach's Alpha for all Individual Strategies Included in the ERP-R and for Helpful and Unhelpful Subscales.

Helpful Strategies		Unhelpful Strategies
<b>Positive Emotions</b>	<b>Behavioural display</b> ( $\alpha=.60$ ) - Using non-verbal behaviours to express positive emotions.	<b>Inattention</b> ( $\alpha=.43$ ) - The tendency to engage in events that are unrelated or harmful to current positive events/experiences.
	<b>Savouring</b> ( $\alpha=.52$ ) - Spending time vividly reminiscing or anticipating positive events and experiences.	<b>Suppression</b> ( $\alpha=.63$ ) - The tendency to avoid expressing positive emotions.
	<b>Capitalising</b> ( $\alpha=.56$ ) - Sharing positive events and experiences with others.	<b>Fault Finding</b> ( $\alpha=.43$ ) - Focusing attention on negative aspects of a positive situation.
	<b>Being Present</b> ( $\alpha=.50$ ) - Deliberately focusing ones attention on current positive events/experiences.	<b>Negative time travel</b> ( $\alpha=.60$ ) - Distancing self from past positive events or anticipating future negative consequences.
	<b>Overall Positive Helpful</b> ( $\alpha=.83$ ) - Sum of all helpful positive strategy scores	<b>Overall Positive unhelpful</b> ( $\alpha=.76$ ) - Sum of all unhelpful positive strategy scores.
<b>Negative emotions</b>	<b>Reappraisal</b> ( $\alpha=.51$ ) - Changing how one thinks about a situation in order to alter its emotional impact.	<b>Rumination</b> ( $\alpha=.43$ ) - Repeated thoughts regarding negative emotions, their cause and consequences.
	<b>Attention reorientation</b> ( $\alpha=.44$ ) - Changing ones focus of attention in order to alter emotions either internally (thoughts) or externally (activities).	<b>Acting Out</b> ( $\alpha=.11$ ) - An attempt to reduce the emotion by acting out behaviours associated with the emotion e.g. aggression in the presence of anger.
	<b>Expression</b> ( $\alpha=.42$ ) - Sharing emotional experiences with others.	<b>Substance Use</b> ( $\alpha=.65$ ) - Using substances e.g. alcohol, marijuana, cocaine to avoid or escape unwanted emotion.

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**Situation modification** ( $\alpha=.30$ ) - Taking action to alter a situation in order to change its emotional impact.

**Learned helplessness** ( $\alpha=.47$ ) - A belief that the individual is unable to influence their emotions and thus makes no active emotion regulation attempt.

**Overall Negative Helpful** ( $\alpha=.63$ ) - Sum of all helpful negative strategy scores.

**Overall negative unhelpful** ( $\alpha=.67$ ) - Sum of all unhelpful negative strategy scores.

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### *Considering internal consistency*

It was originally intended that the relationship between BPF and each emotion regulation strategy would be individually analysed. However, individual strategy scores from the ERP demonstrated poor internal reliability and as a result may lead to spurious findings. It has been reported that Cronbach's alpha can also be influenced by the length of the scale; fewer items diminish Cronbach's alpha and more items increase Cronbach's alpha (Streiner, 2003). Therefore the low Cronbach's alpha scores seen here may be due to the low number of items within each scale. In order to improve internal consistency, the combined scores of unhelpful and helpful strategies were used, this approach to the data produced acceptable internal consistency for negative emotions ( $\alpha=.67$  and  $\alpha=.63$ , respectively) and good internal consistency for positive emotions ( $\alpha=.76$  and  $\alpha=.83$ , respectively). Combining strategy scores in this way may lead to less detailed findings regarding the specific types of strategies used. However, it has previously been argued that as individuals generally use a wide array of strategies during one emotional episode (Aldao & Nolen-Hoeksema, 2013), the investigation of specific strategies in isolation may provide little information on overall pattern of emotion regulation (Carl et al., 2013). Therefore the analysis of strategies by theoretically meaningful groups, such as helpful and unhelpful, may provide a more meaningful overall picture of strategy use.

### **5.3.3. Procedure**

All participants took part in this study as part of a larger study. As such participants completed the PAI-BOR, PDQ-BOR, PDQ-AS, PDQ-HIS, PDQ-NAR and amended ERP-R during phase one and in the presence of the researcher. The order in which these questionnaires were completed was fully counterbalanced. Participants then returned for phase two approximately one week later and were asked to complete

the CES-D and GAD-7 at this stage, the order in which these two questionnaires were completed was also fully counterbalanced. All questionnaires were completed in paper format.

## **5.4. Results**

### **5.4.1. Data screening**

#### *Missing data*

A missing values analysis was conducted to identify the quantity and pattern of missing data for all questionnaires at the level of the item, subscale and total scale values. It has been recommended that having more than 5% missing data for any given variable may be problematic in statistical analyses (Tabachnick & Fidell, 2001). The missing values analyses revealed that all questionnaires at the item, subscale and total level had missing data of 2% or less, well below the recommended threshold of 5%. In addition, a Little's Missing Completely At Random test revealed a non-significant result  $\chi^2 (1173) = 510.49, p > .999$ . This indicates that the data are missing completely at random. All missing values were dealt with at the item level using person mean substitution, which meant that missing values were replaced with the mean of the other items in that scale for that person. This approach was used as it has been found to be the most accurate substitution method, compared to list-wise deletion, item mean substitution, regression imputation and hot-deck imputation, providing data was available for at least 50% of the scale items as was the case for the current dataset (Hawthorne & Elliott, 2005).

#### *Outliers*

In order to identify univariate outliers all variables were first transformed into z-scores (Meyers, Gamst, Guarino, 2013). Using recommendations outlined by Field(2009) values with z-scores above 3.29 were considered significant outliers and considered for amendment or deletion. Two variables were found to contain significant

outliers. One outlier was found for PDQ-AS and two outliers for Age. In order to screen for multivariate outliers Mahalanobis distance was calculated using regression analysis with  $P < .001$  for each case, as recommended by Meyers, Gamst, Guarino, (2013). No multivariate outliers were found. It was decided not to remove the univariate outlier cases as these were considered to be part of the intended sample, however, in order to reduce the impact it was ensured that these values were no higher than the next highest non-outlying score in the distribution plus 1 (Tabachnick & Fidell, 2001).

#### *Assumptions of Hierarchical Multiple Regression (HMR)*

Hierarchical multiple regression (HMR) analyses were used to examine the predictive relationship between BPF and a range of emotion regulation strategies after controlling for demographic variables (Age, Gender), mood disturbance and cluster B personality disorder scores. Hierarchical regression allows the researcher to enter theoretically driven variables or groups of variables in stages, thus allowing the contribution of each added variable or group of variables. Model 1 contained demographic variables: age and gender. Model 2 added mood disturbance scores: CES-D and GAD-7. Model 3 added other cluster B personality scores: PDQ-AS, PDQ-HIS, PDQ-NAR. The final model, Model 4, added the variable of interest: BPF total score. Using the  $R^2$  Change statistic for Model 4 it was possible to see how much of the variance in emotion regulation strategy score is uniquely explained by BPF. In total six HMRs were conducted each with a different dependent variable: (1) unhelpful negative emotion regulation strategies, (2) helpful negative emotion regulation strategies, (3) number of strategies for negative emotion regulation, (4) unhelpful positive emotion regulation strategies, (5) helpful positive emotion regulation strategies, (6) number of strategies for positive emotion regulation.



To explore the assumption of normally distributed residuals, kurtosis and skewness values were converted into z-scores, with values above 1.96 being taken to indicate a deviation from normality (Field, 2009). In addition, a Kolmogorov-Smirnov test was also conducted on the residuals from each dependent variable. Significance tests may be influenced by large sample sizes where small deviations from normality may be identified as significant, therefore histograms and P-P plots of residuals were also used to explore normality. Findings were consistent across the three approaches and indicated that all variables met the assumption of normally distributed variables. This permits the generalisation of findings beyond the current sample (Field, 2009).

The assumption of independence of errors was assessed using the Durbin-Watson statistic. Based on a sample size of 98 with 8 predictor variables in the final model, a threshold of  $2 \pm 1.571$  was used (Savin & White, 1977). All Durbin-Watson statistics for each model fell within this threshold and it was concluded that the assumption had been met.

The assumptions of homoscedasticity and linearity were explored using standardised residuals x standardised predicted value plots and partial plots of the residuals of the outcome variable and each of the predictors for each model. The assessment of these plots indicated that the assumption of homoscedasticity and linearity had been met.

Multicollinearity was assessed using Variance inflation factors (VIF) and inter-correlations between all predictor variables (Table 5.2). It has been recommended that any VIF scores greater than 10 or an average VIF score substantially larger than 1 and tolerance statistics below .2 indicate a problem with multicollinearity (Field, 2009). In the current model all VIF scores are well below 10, the average VIF score is 1.27 and all tolerance statistics are above .2. Exploration of inter-correlations between predictors

revealed that there were medium to strong relationships between BPF, cluster B personality scores and mood disturbance scores, however, all correlations were below recommended threshold for co linearity of  $r > .90$  (Field, 2005). Together these findings indicate that multi-collinearity is not a cause for concern within this dataset. Although the strength of these relationships was not sufficient to violate the assumption of multicollinearity, less than perfect collinearity may still cause statistical problems in providing accurate estimates for independent variables (Berry, 1993). Theoretically the medium to strong relationships between BPF, mood disturbance and cluster B personality features were considered a cause for concern. This is because the borderline personality disorder diagnosis and therefore BPF includes some aspects of mood disturbance, such as marked reactivity of mood or depressivity (American Psychiatric Association, 2000, 2013). In addition all cluster B personality disorders are grouped together as they share common features such as dramatic emotional behaviour (American Psychiatric Association, 2000). Therefore it was theorised that the inclusion of these variables as controls may be too stringent masking variance that may otherwise be explained by BPF. To explore this possibility if BPF were not found to explain unique variance (indicated by a significant  $R^2$  Change for Model 4) the model was re-run twice, once removing cluster B personality scores and once removing mood-disturbance scores.

Table 5.2. Inter Correlations Between All Predictor Variables.

	Borderline	Anxiety	Depression	Age	Gender	Antisocial	Histrionic
Borderline							
Anxiety	.68**						
Depression	.67**	.76**					
Age	.04	.02	-.06				
Gender	.10	.25*	.19	.01			
Antisocial	.57**	.27**	.34**	-.03	-.18		
Histrionic	.48**	.32**	.26**	.01	.08	.26**	
Narcissistic	.49**	.27**	.25*	-.05	.01	.38**	.54**

Note. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

#### 5.4.2. Analysis Results

Table 5.3 presents the range, mean and standard deviation scores for the current sample across all measures. The PAI-BOR mean is higher than has been reported in previous student samples ( $M=26.71$ ; Gardner & Qualter, 2009;  $M=27.23$ ; Trull, 1995), whilst the PDQ-BOR was comparable ( $M=3.26$ ; Gardner & Qualter, 2009). Regarding mood scores above 16 on the CES-D (Radloff, 1977) depression measure and above 15 on the GAD (Spitzer et al, 2006) are considered be high and indicate increased risk of mood disorder. Therefore it appears that there are high levels of mood disturbance within the current sample. Regarding the HMR, Table 5.4 presents the overall model fit ( $F$ ) and  $R^2$  change for each block and Table 5.5 presents standardised beta vales for each outcome variable. Overall Model 1 did not demonstrate a significant model fit for any of the outcome variables; this indicates that demographic variables are not predictive of the types or numbers of strategies used during positive or negative emotion regulation (Table 5.4). Demographic variables remained in subsequent models despite a lack of predictive significance as they are considered to be theoretically meaningful constructs within the model reflecting the real world.

Table 5.3 Range, Mean and Standard Deviation Scores for All Questionnaires used in Study2a.

	Range	Mean (S.D)
Age	18-43	22.30 (5.66)
BPF	5 – 39.5	20.77 (8.01)
PAI-BOR	10-67	34.74 (12.24)
PDQ-BOR	0-9	3.38 (2.33)
Antisocial Personality	0-6	1.33 (1.35)
Histrionic Personality	0-8	2.86 (1.89)
Narcissistic Personality	0-6	2.12 (1.52)
Anxiety	7-28	15.50 (7.38)
Depression	3-50	20.81 (11.33)
ERP-Unhelpful Negative	0-11	5.22 (2.84)
ERP-Helpful negative	1-13	5.64 (2.74)
ERP-Unhelpful positive	0-11	3.45 (3.03)
ERP-Helpful positive	1-16	8.46 (4.16)

*Type of negative emotion regulation strategy*

Table 5.4 shows that for the type of negative emotion regulation strategies, Models 2, 3 and 4 provided a significant model fit with Models 2 and 4 demonstrating a significant  $R^2$  change. The standardised beta values for Model 2 (Table 5.5) indicate that depression and anxiety scores demonstrate a positive predictive relationship with unhelpful strategies and a negative predictive relationship with helpful strategies. This suggests that individuals with higher levels of anxiety and depression use more unhelpful strategies and less helpful strategies in the regulation of negative emotions. The final model, Model 4, was found to explain 4% and 5% unique variance in helpful

and unhelpful strategy scores, respectively. This was after controlling for demographics, mood disturbance and general cluster B personality pathology. Exploration of standardised beta statistics (Table 5.5) revealed that this was a positive predictive relationship for unhelpful strategies and a negative predictive relationship for helpful emotion regulation strategies. This suggests that, consistent with individuals demonstrating high levels of mood disturbance, individuals with high levels of BPF are more likely to use unhelpful strategies and less likely to use helpful strategies when regulating negative emotion. In addition to BPF, histrionic personality scores also demonstrated a significant positive predictive relationship with unhelpful emotion regulation strategies. This suggests that individuals with high levels of histrionic personality features are more likely to employ unhelpful emotion regulation strategies when regulating negative emotions.

#### *Type of Positive Emotion Regulation Strategy*

For positive emotion regulation Models 2, 3 and 4 all provided a significant model fit for helpful and unhelpful strategy scores. However, only model 2 significantly improved model fit according to the  $R^2$  statistic, explaining 29% of the variance in unhelpful strategy scores and 14% of the variance in helpful strategy scores (Table 5.4). Exploration of standardised beta values in Table 5.5 suggest that this was driven by a significant positive predictive relationship between anxiety and unhelpful strategies and a significant negative relationship between depression and helpful strategies. This suggests that individuals with high levels of anxiety are more likely to use unhelpful positive emotion regulation strategies (e.g. inattention, fault finding, suppression, negative time travel) and individuals with higher levels of depression are less likely to use helpful positive emotion regulation strategies (e.g. savouring, capitalising, being present, behavioural display). BPF score was not found to be a unique predictor of the type of strategies used for positive emotion regulation.

However, when mood disturbance scores are removed, BPF becomes significant positive predictor of unhelpful strategies for positive emotion regulation  $\Delta R^2 = .16$ ,  $F=6.02$ ,  $\beta = .57$ ,  $p < .001$  and a significant negative predictor of helpful emotion regulation strategies  $\Delta R^2 = .10$ ,  $F=2.61$ ,  $\beta = -.45$ ,  $p=.001$ . The removal of cluster B personality disorder scores lead to BPF becoming a significant positive predictor of unhelpful strategies  $\Delta R^2 = .03$ ,  $F=8.85$ ,  $\beta = .26$ ,  $p = .039$ , but not of helpful positive emotion regulation strategies  $\Delta R^2 = .00$ ,  $F=3.07$ ,  $\beta = -.01$ ,  $p = .945$ . This suggests that individuals with high levels of BPF are more likely to use unhelpful and less likely to use helpful strategies when regulating positive, yet this appears to be driven by mood disturbance within BPF.

#### *Exploring Individual Strategies*

The relationship between BPF and each individual emotion regulation strategy was explored using partial correlations with age, gender, depression, anxiety and other cluster B personality scores included as control variables (Table 5.7). All relationships were small in magnitude. Only one unhelpful negative emotion regulation strategy; learned helplessness, and two unhelpful positive emotion regulation strategies; inattention and fault finding, were found to be significantly positively and associated with BPF. This suggests that individuals with high levels of BPF tend to use learned helplessness more when regulating their negative emotions and inattention and fault-finding more when regulating positive emotions, regardless of the presence of mood disturbance or cluster B personality features.

When mood disturbance and cluster B personality variables were not controlled, BPF demonstrated significant medium positive relationships with all unhelpful negative emotion regulation strategies and significant medium-small negative relationships with all helpful negative emotion regulation strategies. There were also significant medium-strong positive relationships between BPF and all unhelpful positive emotion regulation

strategies. However, only one helpful positive emotion regulation strategy, *Behavioural Display*, was found to significantly correlate with BPF demonstrating a small negative relationship. This suggests that the presence of mood disturbance or more general cluster B personality features, either as a part of BPF or as co-morbidity factors, further intensifies the unhelpful pattern of emotion regulation strategy use.

Table 5.7. Partial Correlation Coefficients between BPF and Individual Strategy Types

Strategy	BPF(controlling demographics, mood disturbance and cluster B scores)	BPF( controlling for demographics only)
<b>Negative Unhelpful</b>		
Rumination	.190	.37***
Acting out	.072	.39***
Substance use	.138	.39***
Learned helplessness	.201*	.33**
<b>Negative Helpful</b>		
Reappraisal	-.172	-.39***
Situation Modification	-.162	-.34**
Attention Reorientation	-.173	-.27**
Emotion Expression	-.099	-.26*
<b>Positive Helpful</b>		
Behavioural display	-.097	-.22*
Savouring	-.041	-.15
Capitalise	-.041	-.19
Being Present	-.180	-.30**
<b>Positive Unhelpful</b>		
Inattention	.221*	.40***
Suppression	.056	.27**
Fault Finding	.202*	.47***
Negative time travel	.036	.38***

Note.  $p < .05$ ,  $p < .01$ ,  $p < .001$



### *Number of Emotion Regulation Strategies*

When looking at the number of negative emotion regulation strategies used none of the models provided a significant model fit for the number of emotion regulation strategies reported. Model 3 demonstrated a significant  $R^2$  statistic driven by a significant positive predictive relationship between Narcissistic personality scores and the number of strategies reported. BPF were not found to be a significant predictor of the number of strategies used for negative emotion regulation. This finding remained following the exclusion of cluster B personality scores,  $\Delta R^2 = .01$ ,  $F = .82$ ,  $\beta = .10$ ,  $p = .501$ , and mood disturbance,  $\Delta R^2 = .00$ ,  $F = 2.33$ ,  $\beta = -.06$ ,  $p = .685$ , scores from the model.

For the number of strategies reported for positive emotion regulation strategies, Model 3 demonstrated a significant model fit and  $R^2$  statistic explaining 13% of the variance in the number of positive emotion regulation strategies reported after controlling for age, gender, depression and anxiety. Standardised beta values indicate that this was driven by a positive predictive relationship between histrionic personality scores and the number of positive emotion regulation strategies reported. This suggests that in general individuals with higher histrionic scores report using more positive emotion regulation strategies. BPF were not found to be a significant predictor of the number of strategies used for positive emotion regulation. This finding remained following the exclusion of cluster B personality scores,  $\Delta R^2 = .02$ ,  $F = .77$ ,  $\beta = .21$ ,  $p = .160$ , and mood disturbance scores,  $\Delta R^2 = .00$ ,  $F = 2.58$ ,  $\beta = .00$ ,  $p = .995$ , from the model.

Table 5.3. Overall Model Fit (F) and R<sup>2</sup> Change for Each Model.

	Model 1		Model 2		Model 3		Model 4	
	<i>Overall F</i>	<i>R<sup>2</sup> Change</i>	<i>Overall F</i>	<i>R<sup>2</sup> Change</i>	<i>Overall F</i>	<i>R<sup>2</sup> Change</i>	<i>Overall F</i>	<i>R<sup>2</sup> Change</i>
Negative ER Unhelpful strategies ( $\alpha=.67$ )	3.05	.06	7.56***	.19***	5.51***	.04**	8.61***	.04**
Negative ER helpful strategies ( $\alpha=.63$ )	.36	.01	6.07***	.20***	4.13**	.04	4.54***	.05**
Positive ER Unhelpful strategies ( $\alpha=.76$ )	.27	.01	9.62***	.29***	6.14***	.03	5.88***	.02
Positive ER Helpful strategies ( $\alpha=.83$ )	.31	.01	3.88**	.14**	2.96**	.04	2.74**	.04
Number of strategies Negative	1.18	.04	.92	.00	1.99	.10*	1.73	.00
Number of strategies Positive	.64	.01	.46	.01	2.28*	.13**	2.00	.00

\*p< .05, \*\*p< .01, \*\*\*p< .001

Table 5.5. Results of HMR for Type and Number of Strategies used for Positive and Negative Emotion Regulation

	Regulating Negative Emotions						Regulating Positive Emotions						Number of emotion regulation strategies used					
	Unhelpful strategies			Helpful Strategies			Unhelpful strategies			Helpful strategies			Negative emotion regulation			Positive emotion regulation		
	B	SE	$\beta$	B	SE	$\beta$	B	SE	$\beta$	B	SE	$\beta$	B	SE	$\beta$	B	SE	$\beta$
Model 1																		
Age	-.00	.05	-.01	.04	.05	.08	.03	.06	.06	-.04	.08	-.05	.04	.06	.06	-.01	.08	-.01
Gender	-1.69	.68	-.25*	.14	.69	.02	-.31	.77	-.04	-.63	1.05	-.06	-1.55	.86	-.18	-1.17	1.04	-.11
Model 2																		
Age	.00	.04	.00	.03	.05	.07	.04	.05	.07	-.05	.07	-.07	.03	.06	.05	-.02	.08	-.03
Gender	-.99	.64	-.14	-.54	.65	-.08	.65	.67	.09	-1.42	1.02	-.14	-1.53	.90	-.18	-1.08	1.08	-.11
Depression	.06	.04	.23	-.08	.04	-.32	.07	.04	.25	-.12	.06	-.32*	-.02	.05	-.06	-.04	.06	-.11
Anxiety	.13	.08	.24	-.09	.08	-.14	.19	.08	.34*	-.05	.12	-.07	.04	.11	.06	.09	.13	.12
Model 3																		
Age	.00	.04	.01	.05	.04	.10	.04	.05	.08	-.05	.07	-.07	.04	.06	.06	-.01	.07	-.02
Gender	-.98	.60	-.14	-.35	.65	-.05	.70	.70	.09	-1.30	1.05	-.13	-1.30	.90	-.15	-.79	1.06	-.08
Depression	.05	.03	.21	-.04	.04	-.16	.07	.04	.25	-.12	.06	-.32*	-.02	.05	-.05	-.04	.06	-.10
Anxiety	.07	.07	.13	-.07	.08	-.14	.17	.08	.30*	-.10	.12	-.12	-.00	.11	-.00	.03	.12	.04

PDQ-AS	-.08	.21	-.16	-.33	.22	-.17	-.13	.23	-.06	-.22	.34	-.07	-.42	.29	-.16	-.48	.35	-.16
PDQ-HIS	.45	.15	.30**	-.21	.16	-.14	.13	.17	.08	.31	.25	.14	.24	.22	.13	.51	.26	.23*
PDQ-NAR	.32	.19	.18	.26	.21	.14	.28	.22	.14	.34	.32	.13	.58	.28	.25*	.61	.33	.23
Model 4																		
Age	-.01	.04	-.02	.05	.04	.10	.03	.05	.06	-.04	.07	-.06	.04	.06	.07	-.02	.07	-.02
Gender	-.95	.59	-.14	-.35	.65	-.05	.73	.69	.10	-1.3	1.1	-.13	-1.3	.91	-.15	-.78	1.07	-.08
Depression	.03	.03	.11	-.04	.04	-.16	.04	.04	.17	-.10	.06	-.27	-.01	.05	-.04	-.05	.06	-.12
Anxiety	.02	.07	.04	-.02	.08	-.03	.13	.08	.22	-.06	.13	-.07	.00	.11	.01	.01	.13	.01
PDQ-AS	-.33	.21	-.16	-.07	.24	-.04	-.33	.25	-.15	-.03	.38	-.01	-.40	.33	-.16	-.57	.39	-.19
PDQ-HIS	.36	.15	.25**	-.11	.16	-.08	.06	.17	.04	.35	.26	.17	.25	.23	.14	-.57	.39	-.19
PDQ-NAR	.23	.19	.12	.36	.21	.20	.19	.22	.10	.42	.33	.15	.59	.29	.26	.48	.27	.22
BPF Total	.07	.03	.36**	-.08	.03	-.40**	.06	.04	.28	-.06	.05	-.19	-.01	.05	-.03	.58	.34	.21

*Note.* Abbreviations are as follows PDQ-AS= Antisocial Personality score, PDQ-HIS= Histrionic Personality Score, PDQ-NAR= Narcissistic Personality Score, BDF Total= Aggregated Borderline Personality Scores.

\*p< .05, \*\* p< .01, \*\*\*p<.001.

### 5.5. Summary of main findings

Findings indicate that individuals with high levels of BPF are likely to report the use of more unhelpful strategies and less helpful strategies when attempting to regulate negative emotions after controlling for the presence of demographics, mood disturbance and other cluster B personality features. It was also found that individuals with high levels of BPF also tended to report using more unhelpful strategies and less helpful strategies when attempting to regulate positive emotions. However, the latter finding cannot be attributed specifically to BPF, as BPF were only found to predict less use of helpful strategies when mood was *not* controlled and only predicted the use of more unhelpful strategies when either mood or cluster B personality features were *not* controlled. This suggests that these findings may be attributable to the presence of mood disturbance or cluster B as co-morbidity factors or as shared aspects of BPF.

Exploratory analyses looking at individual strategies revealed that for negative emotion regulation strategies, increased reporting of one unhelpful emotion regulation strategy, *helplessness*, was uniquely associated with BPF. When not controlling for mood disturbance and cluster B personality features, BPF demonstrated a significant positive relationship with all unhelpful strategies and a significant negative relationship with all helpful strategies for negative emotion regulation. For positive emotion regulation, increased reporting of two unhelpful positive emotion regulation strategies, *inattention* and *fault-finding*, was found to be uniquely associated with BPF. When not controlling for mood and cluster B personality features, BPF demonstrated a significant positive relationship with all unhelpful strategies and a significant negative relationship with two helpful strategies, *being present* and *behavioural display*. BPF was not found to predict the number of strategies used per emotion regulation episode.

## **5.6. Discussion**

Past research in the field of emotion regulation and BPF has focused on the use of unhelpful emotion regulation strategies to manage negative emotions, ignoring the potential for helpful strategies to also be used within this population. This study aimed to explore the relationship between BPF and the type of helpful/unhelpful strategies for the regulation of both negative and positive emotions. In addition, previous research has highlighted that the number of emotion regulation strategies used in an emotional episode may have important consequences for emotion regulation success (Aldao & Nolen-Hoeksema, 2013). Therefore the number of strategies reported was also explored for negative and positive emotion regulation in relation to BPF. The main findings from this study are discussed in the relevant sections below.

### **5.6.1. Regulation of Negative emotions**

Findings revealed that individuals with high levels of BPF are more likely to report the use of unhelpful strategies and less likely to report the use of helpful strategies for negative emotion regulation. This supports past theory which has suggested that inappropriate attempts to regulate emotions are associated with BPF (Linehan, 1993). Further to this, these predictive relationships were found after controlling for demographic variables, mood disturbance and other cluster B personality disorder scores. This means that the relationships between BPF and the use of helpful and unhelpful strategies are specific and not the result of a more general mood disturbance. This finding also provides preliminary evidence that the use of less helpful strategies for regulating emotion is unique to BPF within cluster B personality pathology. However, it must be acknowledged that this study only controlled for cluster B personality features and therefore it cannot be concluded that this pattern of strategy use is specific to BPF within the broader spectrum of personality disorder. Understanding the specificity of these findings is important to inform potential targets

of treatment strategies. For example in order to try and improve effective strategy choice interventions may want to focus on personality features specific to BPF rather than those shared with other cluster B personality disorders or mood disorders.

The emotion regulation strategies assessed in this study using the ERP-R, were largely consistent with Gross's (1998a) process model of emotion regulation and the generic timing hypothesis, which suggests that antecedent focused strategies are likely to be more helpful than response focused strategies in the regulation of emotions (Gross, 1998a). This is because strategies referred to as helpful in this study may be regarded as antecedent emotion regulation strategies: situation modification, attention re-orientation, reappraisal and expression (a technique to seek assistance in situation modification, attention reorientation and reappraisal; Rime, 2007). Whilst strategies referred to as unhelpful in this study may largely be categorised as response modulation strategies: rumination, acting out, learned helplessness and substance abuse. These types of strategies have their impact later in the emotion generative process, when emotional intensity may be higher demanding a longer period of regulation attempts (Sheppes & Meiran, 2007). Therefore, the finding that individuals with high levels of BPF tend to use more unhelpful, response focused strategies may be taken as an indication that these individuals tend to attempt emotion regulation later in the emotion generative process, where levels of emotion intensity may be higher.

However, it could be argued that due to the wording of the scenarios included in the ERP-R that all strategies included in the questionnaire should be considered response focused. This is because phrases such as 'this makes you feel extremely angry' may encourage participants to report how they would respond once the emotional response was fully active. However, it has been highlighted in the theoretical literature that the presence of an emotional response does not make all strategies

response focused. This is because emotion is generated in cycles. As a result strategies are considered antecedent or response focused within their respective cycle (Gross & Thompson, 2007). Consequently, situation modification, attention re-orientation and reappraisal are considered antecedent-focused because they seek to alter the generation of future emotion. Whereas, rumination, acting out, learned helplessness and substance abuse are considered response-focused because they act to alter the current emotional response directly.

In addition to supporting past research by demonstrating increased use of unhelpful strategies in this population, findings from this study also make an original contribution to knowledge by demonstrating less use of helpful strategies in negative emotion regulation. Past research investigating the use of helpful emotion regulation strategies in relation to BPF has been limited. One such study reported decreased use of the helpful strategy, problem-focused coping, based on clinicians' reports of a sample of individuals with severe levels of BPF, sufficient for a BPD diagnosis (Conklin et al., 2006). Findings from the current study develop this idea further by demonstrating that individuals with high levels of BPF, which may not be sufficient for a diagnosis of BPD, also report using less helpful strategies for negative emotion regulation. In addition the current study explored a range of helpful strategies such as reappraisal, situation modification, attention re-orientation and expression, demonstrating that this finding is not specific to problem-focused coping.

In this study, partial correlations were used to explore the relationships between BPF and each individual emotion regulation strategy. These findings are discussed below but must be interpreted with caution, due to low Cronbach's alpha scores for individual strategy, which may indicate that the strength and significance of the relationships may vary according to the type of emotion to be regulated.



It was found that *learned helplessness* demonstrated a significant relationship with BPF after controlling for demographics, mood and cluster B personality features. The relationship between BPF and learned helplessness (belief that the individual is unable to influence their emotions resulting in no active attempt being made) is in line with past research (Fletcher et al., 2014; Gratz & Roemer, 2004; Salsman & Linehan, 2012) and indicates low levels of emotion regulation self-efficacy in this population. Theoretically it has been suggested that low emotion regulation self-efficacy may lead to a reduction in attempts to actively regulate emotions (Bandura, 1977). Therefore, the relationship between BPF and learned helplessness may be taken as an indication that these individuals are less likely to engage in effortful emotion regulation attempts, which highlights a potential barrier to effective emotion regulation in this population that would benefit from further research.

The removal of depression, anxiety and cluster B personality scores as control variables led to BPF predicting increased use of all unhelpful strategies and decreased use of all helpful negative emotion regulation strategies assessed. With the exception of *learned helplessness*, these relationships were not found to be significant when mood disturbance and cluster B personality scores were controlled. Therefore these findings cannot be attributed to exclusively to BPF. Instead these relationships may be due to the presence of mood disturbances or cluster B personality features, which may be considered a part of BPF or as co-morbid factors. The theoretical issue of whether depression and shared cluster B personality features should be considered a part of BPF or as co-morbidity factors is presented throughout this thesis and is discussed in further detail in Chapter 8.

Nevertheless, this finding suggests that individuals with high levels of BPF tend to report more use of strategies such as rumination, acting out and substance use. The

use of rumination is not surprising given its well documented association with increases in all components of negative emotional responding (Webb et al., 2012) and central role in the emotion cascade model of BPD (Selby & Joiner, 2009). Further to this, increased use of acting out and substance use as emotion regulation strategies provides preliminary evidence for behavioural dysregulation associated with BPF, resulting from unhelpful attempts to regulate unwanted negative emotions; a theoretical link proposed in Biosocial Theory (Linehan, 1993) and the Emotion Cascade Model (Selby & Joiner, 2009).

The negative association between BPF and reappraisal, attention-reorientation, expression and situation modification makes a unique contribution to the literature as the use of helpful strategies has not previously been explored in relation to BPF. Each of these strategies has previously been associated with benefits in reducing negative emotions (Nelis et al., 2011). Thus reduction in the use of these strategies may explain the high levels of negative emotion experienced by individuals with high levels of BPF. The finding that individuals with high levels of BPF report less use of negative emotion expression is consistent with Biosocial theory (Linehan, 1993), which suggests that as a result of invalidating environments, individuals with high levels of BPF learn not to share their negative internal experiences with others. However, it comes as some surprise that individuals with high levels of BPF would use less attention re-orientation strategies given past theoretical and empirical literature suggesting that these individuals use extreme behaviours, such as self-harm, to distract themselves from unwanted negative emotion (Brown et al., 2002; Paris, 2005; Selby & Joiner, 2009). However, the attention-reorientation responses in this study were less extreme and therefore may not have represented the distraction techniques used by individuals with high levels of BPF. Instead they referred to diverting attention away from negative stimuli and towards unrelated positive thoughts. Similarly reappraisal required looking

for positive aspects or outcomes of the negative situation and situation modification requires disengaging from negative stimuli in order to identify ways that the situation can be improved or resolved. Therefore all of these strategies require redirecting attention away from negative information/stimuli, a skill which has been found to be problematic for individuals with high levels of BPF (Domes et al., 2006; Silbersweig et al., 2007). The inability to do this may explain why these types of strategies appear to be used less by individuals with high levels of BPF.

### **5.6.2 Regulation of Positive emotions**

Findings from analyses on positive emotion regulation showed no predictive relationship between BPF and helpful or unhelpful positive emotion regulation strategies after controlling for demographics, mood disturbance and cluster B personality scores. This finding may be interpreted as an indication that emotion regulation problems associated with BPF are not related to positive emotion regulation processes. However, removal of mood disturbance scores as control variables in the model indicated that individuals with high levels of BPF were reporting the use of significantly more unhelpful strategies and less helpful positive emotion regulation. This suggests that problematic positive emotion regulation in relation to BPF may be the result of a more general mood disturbance. This interpretation contradicts recent research, which reports that after controlling for co-morbid mood disorder, individuals with a diagnosis of BPD demonstrate increased use of the unhelpful strategy positive emotion suppression (Beblo et al., 2013). The difference in findings between the current study and Beblo et al. (2013) may be explained by the different techniques used to control depression and anxiety. Beblo et al. (2013) did not directly measure levels of depression but noted that the majority of the BPD sample also had a diagnosis of major depressive disorder (MDD) or an anxiety disorder. In order to eliminate the effects of co-morbidity, participants with a co-morbid diagnosis were removed and the analyses

were repeated, revealing equivalent results. However, it may be that the remaining subsample (n=11) demonstrated high levels of depression and anxiety, which fell short of diagnostic thresholds. Therefore it could be that it was sub threshold features of depression and anxiety rather than BPD specifically that drove this finding.

In the current study depression and anxiety were controlled for as continuous variables. When these variables were fully controlled BPF were not found to predict problematic patterns of positive emotion regulation strategy use. However, when depression and anxiety were not controlled a problematic pattern of positive emotion regulation strategy use emerged. As a result it is suggested here that problematic positive emotion regulation associated with BPF is likely to result from high-levels of mood disturbance, which may be considered a part of BPF or a co-morbidity factor.

Exploratory analyses of individual strategies revealed that BPF was uniquely associated with increased *inattention* (the tendency to engage in events that are unrelated or harmful to current positive events/experiences) and *fault finding* (focusing attention on negative aspects of a positive situation) after controlling for age, gender, depression, anxiety, and other cluster B personality scores. The removal of depression, anxiety and cluster B personality scores as control variables led to BPF demonstrating a moderate significant positive relationship with all unhelpful strategies; *inattention*, *fault-finding*, *negative time travel*, *suppression*, and a significant negative relationship with two helpful strategies *being present* and *behavioural display*. Although preliminary, these findings are important as they provide a more detailed insight into how individuals with high levels of BPF attempt to regulate their emotions and the features that may be problematic. A common theme across three of the unhelpful strategies associated with BPF is the tendency for attention to be drawn away from the positive stimuli or experience and toward negative or irrelevant information. In line

with this one of the helpful emotion regulation strategies used significantly less in this population, *being present*, requires one to maintain focus on current positive aspects of a situation.

The over-reporting of strategies to divert attention away from positive stimuli and under reporting of strategies that require attention maintenance on positive aspects of a situation may be an indication of the presence of a negative attention bias in individuals with high levels of BPF. This interpretation is consistent with the emotion cascade model (Selby & Joiner, 2009) and experimental research (Silbersweig et al., 2007) suggesting that individuals with high levels of BPF reported more problems disengaging from negative stimuli, which may result in rapid escalation of negative emotion intensity. This interpretation also extends past literature by suggesting that attentional bias not only affects negative emotion regulation processes but it may also be interfering with attempts to initiate or maintain positive emotions. This is consistent with research demonstrating that negative emotionality may reduce positive emotions in individuals with high levels of anxiety (Williams, Peeters, & Zautra, 2004). It is therefore proposed that the over-use of unhelpful strategies, such as rumination, for decreasing negative emotions results in higher levels of negative emotion, which in turn inhibits positive emotion regulation attempts and the subsequent development of positive emotions in this population.

Theoretically, the finding that individuals with high levels of BPF demonstrate problematic patterns of positive emotion strategy use is consistent with biosocial theory (Linehan, 1993), which states that although the problems in negative emotion regulation processes are more pronounced, individuals with high levels of BPF are also likely to experience difficulty in areas of positive emotion regulation. Further, findings from this study extend this theoretical viewpoint by identifying the use of unhelpful positive

emotion regulation strategies, which appears to be driven by poor attentional control. Although, the empirical investigation of positive emotion regulation processes in relation to BPF is still in its infancy, the findings from this study highlight potentially problematic patterns of positive emotion regulation, which may help to explain the low levels of positive emotionality previously associated with high levels of BPF (Ebner-Priemer et al., 2007; Reed & Zannarini, 2011).

### **5.6.3. Number of Strategies Used**

Past research has suggested, consistent with the process model of emotion regulation (Gross & Thompson, 2007; Gross, 1998a), that some individuals attempt to use more than one strategy during a single emotion regulation attempt (Aldao & Nolen-Hoeksema, 2013). Further to this the use of multiple strategies as opposed to one strategy was found to be less effective in reducing negative emotions and as such may be a contributing factor to emotion regulation problems. To the best of the author's knowledge, at the time of writing this is the first study to explore the number of strategies used during an emotion regulation episode in relation to BPF.

Findings did not indicate any significant predictive relationships between BPF and the number of strategies used in an emotion regulation episode for positive or negative emotions, irrespective of the inclusion of mood disturbance and cluster B personality scores as control variables. This suggests that individuals with high levels of BPF do not differ from those with low levels of BPF in the number of strategies used per emotion regulation attempt. Taken together with earlier findings in this study this suggests that it is the type rather than number of strategies used that is problematic in this population.

### **5.6.4. Limitations and Future Research**

It is acknowledged that the current research study demonstrates some limitations. Firstly, the current study was unable to provide a robust investigation of the

relationship between BPF and individual strategy types. This was due to poor Cronbach's alpha scores for individual strategy types, which are likely to have been caused by the low number of items included in the ERP-R administration, but may also be an indication that the types of strategies used vary depending on the emotion to be regulated. Therefore further research is needed to establish if individuals with high levels of BPF are more likely to use unhelpful strategies for the regulation of some emotions more than others. This information would be beneficial to inform more focused targets for intervention, such as supporting individuals in the effective regulation of specific emotions rather than emotion regulation more generally.

Secondly, the current investigation measured strategy use using a scenario based self-report questionnaire, whereby individuals were given a set number of emotion regulation strategies to choose from. Therefore, the strategy options provided may have omitted some of the strategies used by participants, reducing the number of strategies reported. As a result, findings may not be representative of the full range of strategies used by participants. Similarly, anecdotal evidence suggested that some participants experienced difficulty responding to scenarios that represented situations they had never personally experienced. For example, one item referred to anger building as a result of road rage. Another item described sadness as a result of a relationship breakdown. If the participants had not experienced these situations there may have been a tendency to report how they believe one should respond in these situations or how they have seen others respond. This may impact on the validity of findings.

Finally, although efforts were made to gain a more balanced sample, the sample of the present study was predominantly female. This is consistent with other empirical studies in the emotion regulation field (e.g. Aldao & Nolan-Hoeksema, 2013).

Although gender was included as a control variable in statistical analyses, the low number of male participants (20%) prevent the generalisation of findings across gender.

#### **5.6.5. Conclusions and Implications**

Biosocial theory, a seminal theory of the development and maintenance of BPF, suggests that BPF are the cause and consequence of inappropriate and ineffective attempts to regulate emotions (Linehan, 1993). Findings from the current study develop this theoretical viewpoint by highlighting strategy choice as potential reason for emotion regulation problems in this population. More specifically, this study demonstrates that poor strategy choice in this population is not limited to the overuse of unhelpful strategies, which has been portrayed in past research, but also includes the under-use of helpful emotion regulation strategies, as reported in section 5.6.1. Further, this study shows that unhelpful patterns of strategy use extends to positive emotion regulation, as reported in section 5.6.2. This highlights the need for further research to explore positive emotion regulation processes, an area often neglected in research exploring BPF.

Subject to future replication, findings from this study may help to inform non-clinical support services, such as educational and community counselling services, on how best to support individuals with high levels of BPF displaying emotional difficulties. In particular the findings of this study highlight the need to support individuals to use more helpful strategies in addition to reducing the use of unhelpful strategies. Further to this consideration of common features across the specific types of strategies used by these individuals has highlighted that poor attentional control may be a key emotion regulation skill that is problematic in this population. Thus current findings suggest attentional control as a potential target for intervention, to facilitate the use of more helpful emotion regulation strategies.



An attentional control deficit is just one possible explanation for why these individuals select more unhelpful emotion regulation strategies. In order to support these individuals to use more helpful emotion regulation strategies further research is needed to gain a detailed understanding of other possible factors influencing strategy choice in this population. The emotion regulation literature has highlighted three major factors that may influence strategy choice: emotional intensity, perceived cognitive demand of the strategy, and the presence of long versus short term emotion regulation goals (Sheppes et al., 2012). Out of the three factors identified the intensity of the emotion to be regulated was found to have the greatest influence on strategy choice and was found to influence strategy selection regardless of cognitive demand and motivational goal. Emotion intensity at the point of strategy implementation is explored in study 2b.

## **Chapter 6 : Study 2b - The Implementation of Emotion Regulation Strategies in relation to Borderline Personality Features**

### **6.1. Abstract**

This study aimed to explore features affecting the implementation of emotion regulation strategies in relation to Borderline Personality Features (BPF). More specifically the present study makes an original contribution to knowledge by exploring how the occurrence of effortful emotion regulation attempts, the intensity of emotion when regulated and the duration of emotion regulation attempts relate to BPF. This was achieved using a university student population (N=99). Participants completed self-report questionnaires on demographics, mood and personality as part of a larger study including study 2a and 2c. This study (2b) used experience sampling methodology (ESM) to explore the occurrence of effortful emotion regulation attempts, the intensity of emotion at its time of regulation and the duration of emotion regulation attempts as they occur in real life settings. This required participants, when prompted, to complete a set of questions relating to their emotion regulation attempts 6 times per day, for 7 days. Findings indicate that the presence of BPF does not affect the occurrence of effortful positive or negative emotion regulation attempts. However, it was found that individuals with high levels of BPF attempt to regulate their negative emotions when they are more intense and do not demonstrate an increase in the duration of these attempts. In addition it was found these individuals spend less time regulating their positive emotional experiences.

## **6.2. Introduction**

The process model of emotion regulation suggests that emotion is generated through a sequenced process involving a situation, which is attended to and appraised resulting in the activation an emotional response (Gross, 1998a). It has been theorised that the intensity of an emotional response gradually builds throughout this process until the final appraisals are made (Scherer, 2013). Based on this model and consistent with appraisal theories (e.g. Lazarus, 1991), it has been suggested that an emotional response can be regulated by altering any stage in its development or by acting to change the emotion response directly (Gross, 1998a). Consequently the process model of emotion regulation (Gross 1998a) groups strategies according to where in the emotion generation process they have their primary impact. It was originally proposed that antecedent-focused strategies, which act before an emotional response is fully generated, are more effective than response-focused strategies, which act to directly change emotional responses once they are fully formed and therefore more intense (Gross, 1998a). This is known as the generic timing hypothesis. However, it has been noted that antecedent and response-focused emotion regulation strategies demonstrate differences beyond the timing of their impact. For example, some strategies require more cognitive resources (Sheppes & Meiran, 2008) and this may also influence the success of the strategy in changing an emotional response. This led to the proposal of an alternative hypothesis: the process-specific timing hypothesis (Sheppes et al., 2011). This hypothesis suggests that while timing (indicated by emotional intensity) may be important for the success of some strategies, other strategies may remain unaffected. This is based on the theory that when emotion regulation strategies are implemented, they compete with cognitive processes involved in the generation of emotion to gain the required cognitive resources. Therefore some strategies such as reappraisal, which require substantial cognitive resources, may become less effective in the presence of intense negative

emotion, where competition for cognitive resources is high. Yet other strategies such as distraction, require minimal cognitive resources and are less likely to be influenced by the presence of intense emotions (Sheppes & Meiran, 2008). Research has supported this demonstrating that reappraisal but not distraction becomes less effective when emotion intensity increases (Sheppes & Meiran, 2007). This suggests that emotion regulation success is dependent on both the type of strategy used and the intensity of the emotion when a regulation attempt is made.

In line with this it has been reported that the intensity of an emotion when it is regulated has a significant impact on strategy selection (Sheppes et al., 2011). If emotional intensity is high individuals are more likely to select disengaging strategies, such as distraction, rather than engagement strategies, such as reappraisal (Sheppes et al., 2012, 2011). Further to this, the influence of emotion intensity remains stable regardless of other factors known to influence strategy choice, such as perceived cognitive demand or the presence of long versus short term goals. For example increased negative emotion intensity was found to be associated with the selection of disengaging strategies despite the presence of a long term goal, for which the strategy would be unhelpful (Sheppes et al., 2012). This suggests that emotion intensity at the point of regulation may be an overriding factor when choosing emotion regulation strategies.

The emotion regulation literature discussed above (Sheppes et al., 2011, 2012), suggests that the intensity of emotions *at the point of regulation* may influence strategy choice and emotion regulation success. One of the defining features of BPD according to DSM IV and DSM 5 is the presence of inappropriate intense anger, which is present across a variety of contexts, such as in occupational, social and family situation (American Psychiatric Association, 2000, 2013). Further to this, it has been well

reported throughout the literature that individuals with high levels of BPF or BPD report experiencing increased intensity and instability of a range of negative emotions including anxiety, anger, sadness, shame and disgust (e.g. Ebner-Priemer et al., 2007; C. Henry et al., 2001; Nica & Links, 2009; Stiglmayr et al., 2005). In addition this group of individuals have been reported to use high levels of disengaging strategies, such as deliberate self-harm as a distraction technique, in attempts to manage their intense emotional experiences (Brown et al., 2002; Chapman, Dixon-Gordon, & Walters, 2011). Based on the literature discussed above, which states that anger intensity is a diagnostic feature of BPD, high emotion intensity is associated with BPF and that disengaging strategies are used by these individuals, it was hypothesised that BPF would be associated with increased emotion intensity at the point of regulation.

However, past research has only explored emotion intensity in relation to BPF either before or after an emotion regulation attempt not at the time the attempt took place. Due to the dynamic nature of emotion and high emotion instability in this population (Nica & Links, 2009) this may not be representative of emotion intensity at the point of regulation. Therefore it is currently unclear whether individuals with high levels of BPF attempt to regulate their emotions when intensity is high, which may cause problems in emotion regulation, or whether an inability to regulate emotions effectively leads to high emotion intensity. This was explored in the current study.

Despite the presence of high emotion intensity Sheppes et al. (2007) found that helpful engagement strategies such as reappraisal may still be effective, if used over a prolonged period of time. This suggests that the duration of emotion regulation attempts may also play a vital role in determining emotion regulation success. Therefore individuals with high levels of BPF may be able to regulate intense emotions effectively

using helpful strategies if they persist in emotion regulation over a longer period of time.

The importance of duration for effective emotion regulation is further supported by research comparing the effects of using one versus multiple emotion regulation strategies during a single emotion regulation attempt (Aldao & Nolen-Hoeksema, 2013). Participants were asked to report on the emotion regulation strategies that they had used during a disgust inducing film clip. Aldao et al., found that 65% of the sample reported using more than one emotion regulation strategy, with the remaining 35% reporting the use of only one strategy. Participants were also asked to indicate the extent to which they used each of the strategies reported (e.g. ‘not at all’, ‘a little’, ‘somewhat’ or ‘a lot’). It was found that participants using only one strategy reported that they used it to a greater extent to those using multiple strategies. This indicates that individuals choosing only one strategy implemented it for a longer period of time than individuals using multiple strategies, who appeared to use each strategy for a shorter period of time. Individuals using multiple emotion regulation strategies, compared to those using only one, reported more intense negative emotion experience compared to participants using only one strategy. This suggests that shorter durations of emotion regulation may be detrimental to emotion regulation success.

It is hypothesised that individuals with high levels of BPF may attempt to regulate their emotions over a shorter period of time as a result of low levels of distress tolerance (Gratz et al., 2006). Research exploring emotion regulation in relation to BPF has reported that when individuals with high levels of BPF are *instructed* to use specific emotion regulation strategies for a *set duration*, they are able to use a range of strategies successfully to increase positive and decrease negative emotions (Chapman et al., 2009; Jacob et al., 2011). However, individuals with high levels of BPF have been found to

demonstrate low levels of distress tolerance in the pursuit of emotion regulatory goals (Gratz et al., 2006). Some helpful emotion regulation strategies, such as reappraisal, require engagement and processing of the emotional stimuli, which may at times be distressing. Therefore it may be that when in real life situations, where the required duration of emotion regulation is not specified, low levels of distress tolerance may prevent these individuals from employing emotion regulation strategies for a sufficient period of time to successfully influence emotions.

Further to this, research has found that individuals with high levels of BPF perceive themselves to be helpless in emotion regulation (Fletcher et al., 2014; Glenn & Klonsky, 2009; Salsman & Linehan, 2012). This may be taken as an indication that individuals with high levels of BPF demonstrate low levels of emotion regulation self-efficacy; the perception of one's own ability to effectively regulate emotions. Self-efficacy theory suggests if the individual does not have confidence in their ability to implement strategies effectively, they are less likely to initiate emotion regulation attempts and are more likely to give up when faced with obstacles, such as continued experience of the unwanted emotion (Bandura, 1977). In light of self-efficacy theory, it appears that low emotion regulation self-efficacy (Fletcher, 2014; Glen & Klonsky, 2009; Salsman & Linehan, 2012) may lead to less attempts to regulate emotions and shorter durations of emotion regulation when attempts are made. To date the likelihood of individuals attempting to regulate their emotions and the duration of attempts made has not been explored in relation to BPF.

In the past, the empirical literature both in the field of emotion regulation and BPF has focused heavily on negative emotion regulation processes. However, a recent review has highlighted potential for disturbances in positive emotion regulation processes to be present in a range of emotional disorders including anxiety, depression

and bipolar disorder (Carl et al., 2013). Despite this research exploring positive emotion regulation in relation to BPF is limited to a few experimental studies, which instructed individuals to regulate their positive emotions using specified strategies and found that they were able to do so effectively (Jacob et al., 2011). In order to develop understanding of positive emotion regulation processes in relation to BPF the current study paid equal attention to both negative and positive emotion regulation attempts.

In summary, the emotion regulation literature has highlighted several features in the implementation of emotion regulation attempts that are likely to influence emotion regulation success, such as the intensity of emotions when regulated and the duration of emotion regulation attempts. As a result it is theorised that these factors may be associated with emotion regulation difficulties associated with BPF. Yet to date these factors have not been explored in relation to BPF. The current study used Experience Sampling Methodology (ESM) to explore the intensity of positive and negative emotions at the time of their regulation and the duration of emotion regulation attempts made. It was hypothesised that individuals with higher levels of BPF would make attempts to regulate their emotions when intensity was higher, that the duration of emotion regulation attempts would be shorter. In addition this methodology allowed investigation of the hypothesis that individuals with high levels of BPF make attempts to regulate their emotions less often as a result of low emotion regulation self-efficacy.

### **6.3. Method**

#### **6.3.1. Participants**

The sample used in this study is consistent with the sample reported in study 2a, minus one male participant. This resulted in a sample of N= 99 participants in the present study with a mean age of 22.30(SD= 5.66). There were n= 80 females (M=22.32, SD=5.54) and n=19 males (M=22.26, SD=6.28). For full details on the sample demographics the reader may refer back to chapter 5.



Using the classification procedures outlines in study 1, 25.3% of the participants included in study 2b scored above the threshold for high levels of BPF on both measures, 23.2% on one measure only and 51.5% scored below the threshold on both measures of BPF. Information regarding the range mean and standard deviation of BPF scores in this sample is presented in Table 6.2.

### **6.3.2. Materials**

The rationale for selection and psychometric properties of the measures included in this study has been discussed at length in chapter 3. In addition details of alpha coefficient for the current sample have previously been reported in section 5.3.2. As a result in this section only descriptive information is included to facilitate understanding of the analysis for the reader. The reader may refer back to chapter 3 for further details.

#### *Personality Assessment Inventory – Borderline Scales (PAI-BOR; Morey, 1991)*

The 24-item PAI-BOR scale was taken from the larger 344 item Personality assessment inventory; designed to assess personality pathology according to DSM-IV diagnostic criteria (Morey, 1991). The scale was used to assess the presence of borderline personality traits within the research population.

#### *Personality Diagnostic Questionnaire-4 (PDQ-4; Hyler, 1994)*

The PDQ-4 (Hyler, 1994) is a 99-item self-report screening measure based on criteria for personality disorder according to the DSM-IV (American Psychiatric Association, 2000). From the larger PDQ-4 only scales to assess cluster B personality features were used: borderline scale (BS), anti-social scale (AS), histrionic scale (HIS) and narcissistic scale (NAR).

#### *Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004)*

The DERS is a 36-item self-report questionnaire that assesses difficulty in emotion regulation with six subscales: non-acceptance, goals, impulse, awareness,

strategies and clarity. In the present study the ‘strategies’ subscale was used as an indicator of emotion regulation self-efficacy. This scale includes items such as ‘*When I’m upset, I believe that I will remain that way for a long time*’

*Center for Epidemiology Studies-Depression Scale (CES-D; Radloff, 1977)*

The CES-D is a 20-item self-report questionnaire designed to measure depression symptoms in the general population and was used to assess the presence of features of depression in the current sample.

*Generalized Anxiety Disorder Screener (GAD-7; Spitzer et al., 2006)*

The GAD-7 is a seven item self-report questionnaire assessing the presence of symptoms of anxiety disorder and was used to assess levels of anxiety in the current sample.

*Experience Sampling Diary*

The content of the experience sampling diary was designed to assess three major features in the implementation of emotion regulation: the occurrence of emotion regulation attempts, the intensity of the emotion at the time of regulation (real-time emotion intensity) and the duration of emotion regulation attempts. A full copy of the ESM Diary developed for this study can be found in Appendix 4.

The first question in the experience sampling emotion regulation diary asked participants to indicate how they were feeling at that moment in time. This was assessed using the Positive and Negative Affect Scales (PANAS; Watson, Clark, & Tellegen, 1988). These scales are made up of 10 positive and 10 negative affect items and participants are required to respond to indicate how much they are experiencing each, at that moment in time, using a 5- point Likert scale ranging from 1-very slightly or not at all, to 5-extremely. Responses from this question were used to indicate general emotion intensity.

Participants were then asked to think about and report their most negative emotional experiences since the last prompt. This question was designed to focus the individual on a specific negative emotion episode. They were then asked to indicate whether or not they actively attempted to alter the emotion in any way ('Yes' or 'No'). This provided a measure of the occurrence of active emotion regulation attempts. If the individual reported actively attempting to regulate the negative emotion, they were then asked to report how intense the emotion was at the time of regulation using the negative scale from the PANAS (Watson et al., 1988). This score was used to represent negative emotion intensity at the time of regulation. They were then asked to indicate how they attempted to influence the emotion and how long for (in minutes). This information was used to indicate the duration of emotion regulation attempts. Participants were then asked to respond to the same set of questions for positive emotional experiences.

### **6.3.3. Procedure**

Informed consent was obtained from all participants prior to participation. During the first session participants were asked to complete a paper based questionnaire booklet which included: Demographic questionnaire, PAI-BOR, PDQ-BOR, PDQ-AS, PDQ-HIS, PDQ-NAR, ERP-R and the DERS.

Experience sampling methodology (ESM) was then used to explore how emotion regulation was conducted in real life settings. This required participants to carry the A5 ESM diary with them at all times over a period of seven days. The participant was then prompted six times per day to complete their ESM diary. Prompt times were allocated individually for each participant using a time stratified random sampling procedure. Each day (12 hours) was divided into six equal blocks of time, two hours each. A random number generator was then used to identify when within each two hour block the prompt would be delivered. It was ensured that no two prompts occurred within 15 minutes of each other. In order to minimise participant burden

prompt times were tailored to individual waking hours (e.g. 10.00-2200 or 8.00-20.00). Google Calendar was used to deliver prompts via text message to participant's mobile phones.

All participants were required to provide their personal mobile phone number to allow prompts to be made via text message. Following this the ESM procedure was explained and practiced to ensure that the participant fully understood how to respond to each prompt. It was stressed to participants that it was acceptable to miss some prompts, such as when driving, but that all prompts made must be honest and at the time of the prompt text message.

Following the seven day ESM period participants attended a second session during which they were asked to return their ESM diary and complete a short mood questionnaire booklet containing the CES-D and the GAD-7. Participants were thanked and fully debriefed before leaving.

#### *Counterbalancing of self-report measures*

The order of self-report measures included in the questionnaire booklet one and two were fully counterbalanced using a balanced Latin square design. However questionnaire booklet one was always completed prior to completion of the ESM diary and booklet two after the ESM diary had been completed. This was because the measures included in booklet two requested that the participant reflects over the past several days. By delivering these questionnaires after the ESM Diary completion period depression and anxiety scores reflect levels during participation.

## **6.4. Results**

### **6.4.1. Dropout**

As noted in study 2a 112 participants were successfully recruited into the study. Of these participants n=12 (11%) failed to return for completion of phase two of the

study and therefore did not return their ESM diaries. This was treated as withdrawal and participants were removed from the dataset. In addition, one participant returned to complete phase two but failed to return the ESM Diary, resulting in exclusion of their data from the current study. This resulted in a sample of 99 participants to be included in analyses.

#### **6.4.2. Outline of Variables and Data structure**

The use of experience sampling methodology often leads to clustering within the dataset. In the current dataset a three level structure is anticipated, as discussed in chapter 3 (level one=prompt, level two=day, level three=person). There were many variables assessed in this study and these variables were assessed at different levels of the dataset. For example, age is a person level variable and was recorded once for each person, but negative emotion intensity is a prompt level variable as this was recorded on each prompt (six times per day). No variables were assessed at the day level in this dataset; this level is included to account for clustering of variance only. A full description of all variables and the level of their measurement are provided in Table 6.

1.

Table 6.1. Definitions and Level Specification for All Variables.

Level Three (Participant) Variables	Definition
Age	Self- Reported age of Participants.
Gender (binary)	Self-reported gender of participants.
Depression Score	Scores obtained from the CES-D.
Anxiety Score	Scores obtained from the GAD-7.
Anti-social Personality (ASP)	Scores obtained from the PDQ-AS.
Histrionic Personality (HISP)	Scores obtained from the PDQ-HIS.
Narcissistic Personality (NARP)	Scores obtained from the PDQ-NAR.
Borderline Personality Features (BPF)	Aggregated scores from the PDQ-BOR and PAI-BOR.
Emotion Self Efficacy	Scores obtained from the ‘strategies’ subscale of the DERS.
Level One (Prompt) Variables	Definition
Real-time negative emotion intensity	Reported emotion intensity at the time of emotion regulation. Assessed using negative PANAS scale.
Real-time positive emotion intensity	Reported positive emotion intensity at time of emotion regulation. Assessed using positive PANAS scale.
Negative emotional intensity	Current negative emotion intensity at time of prompt. Assessed using negative PANAS scale.
Positive emotional intensity	Current positive emotion intensity at time of prompt. Assessed using positive PANAS scale.
Duration of negative emotion intensity	Reported duration of negative emotion regulation attempt in minutes.
Duration of positive emotion intensity	Reported duration of positive emotion regulation attempt in minutes.
Alter negative emotion (Binary)	Participants were asked to report on each prompt whether or not they attempted to alter their negative emotion ‘yes’ (1) or ‘no’ (0).
Alter positive emotion (Binary)	Participants were asked to report on each prompt whether or not they attempted to alter their positive emotion ‘yes’ (1) or ‘no’ (0).

### **6.4.1. Data Screening**

#### *Missing data*

In the multi-level dataset arising from the ESM data collection, three types of missing data were identified. The first type of missing data is ‘missed prompt’: this means that the individual did not enter any data into the diary on this prompt. A frequency analysis revealed that 23% of prompts were missing. This means that some individuals may have produced more data entry points than other individuals in the sample. However, multi-level modelling does not assume equal cluster sizes for each higher level unit and therefore this missing data will not be problematic during analysis (Rasbash, Steele, Browne, & Goldstein, 2012). The second type of missing data is ‘not applicable’ missing data: this occurs when participants report that they made no effort to change their emotions and therefore were not required to answer subsequent questions. This type of missing data accounted for 44.9% and 58.6% of the data in variables assessing negative and positive emotion regulation, respectively. The difference in the amount of non-applicable missing data for positive and negative emotion regulation indicates that overall individuals were more likely to report consciously regulating negative emotions than positive emotions. For analyses exploring emotion intensity at the time of emotion regulation and duration of the emotion regulation attempt, these data points (where no emotion regulation attempts were made) were removed from the dataset prior to analysis. This left only complete prompts where people had attempted to regulate their emotions in the dataset and resulted in a level one sample size of N=761 prompts for positive emotion regulation analyses and N=1346 prompts for negative emotion regulation analyses.

The final type of missing data is ‘missing response’: this is where participants have failed to provide a response for specific items in the diary and accounts for less

than 1% for all diary variables. This is well below the recommended threshold of 5% and therefore is unlikely to create any bias in the data (Tabachnick & Fidell, 2001).

### *Outliers*

The process and findings of screening level three (person level) variables used across all study 2a, 2b and 2c have been described in Chapter 5, therefore the reader may refer back to Chapter 5 for this information. Here the focus will be on the identification of outliers in the variables specific to this study, such as emotion intensity, duration of emotion regulation. When exploring outliers in multi-level datasets it is important to establish at what level the outlier lies. For example, if several outlying data points come from the same person it can be said that the person is an outlier (level three outlier) demonstrating more extreme scores than other individuals in the dataset. This type of outlier would be problematic for analyses in this study which look at explaining person level variance. However, if outliers are dispersed across people it indicates that the outlier is at the prompt level (level one) as a one-off event and are not representative of the individual on the whole. This type of outlier is not problematic for current analyses, which aimed to explain person level variance after removing variance accounted for at the prompt level.

In order to identify potential outliers Z-scores were calculated for all variables, with z-scores greater than 3.29 taken to represent significant outliers (Field, 2009). Level one (prompt level) variables relating to negative emotion were found to contain between 19 and 66 outlier cases; variables relating to positive emotions were found to contain between one and seven outlier cases. BPD is characterised by extreme and unstable emotional experiences (Nica & Links, 2009) and it is therefore expected that high BPF participants may demonstrate extreme scores on level one (prompt level) variables. However, no person level outliers (level three) were identified for variables relating to positive or negative emotions. This indicates that outliers are evenly



distributed across participants and do not appear to have a significant impact on participant level scores. Therefore they were not considered problematic for current analyses which aimed to explain participant level variance after removing prompt level variance.

#### **6.4.2. Analysis outline**

##### *Exploring the data structure*

Theoretically it is reasonable to suspect that the data set collected using the experience sampling diaries may demonstrate a clustered structure. This is because the data points came from different people, on different days, at different time points. Therefore it is reasonable to assume that multiple data points taken from one person, day or prompt are likely to be more similar to each other than they are to data points taken from another person, day or prompt. Therefore theoretically there may be a three level data structure: level one – Prompt, Level two – Day, Level three – Person. If the data are clustered in this way it is important to take this structure into account when building statistical models for two main reasons. Firstly, statistical models are used to try and replicate what we see in a real life situation. Therefore, in order to ensure that the statistical model reflects the real world as closely as possible and explains maximal variance, it is important to take into account the known structure in which the data were collected. Secondly, if the data are clustered then the assumption of independence of errors necessary for single level regression models using ordinary least squares has been violated and the resulting model may increase the risk of type one errors. Multilevel modelling does not make this assumption and allows residuals to be correlated (Rasbash et al., 2012).

In order to assess the structure and clustering of the data for each dependent variable a single level null model and three level variance components model (VCM) were computed. Each null model contains only the dependent variable and no

predictors, allowing the clustering of the dependent variable variance to be explored. The results of these models were explored and compared using the log-likelihood statistic to examine whether the single or multi-level model structure provided the best fit.

### *Building the model*

Once the model structure had been decided predictor variables were added. Consistent with analyses in study 2a variables were added to the model in stages, with control variables being added in the first 3 models: Model 1: age and gender, Model 2: Depression and Anxiety scores, Model 3: Anti-social, Histrionic and Narcissistic personality scores. Dependent on the individual research questions, additional control variables may be added in Model 4. For example, when exploring real-time *negative* emotion intensity, current emotion intensity was included in Model 4 as a control variable. The final model always added the variable of interest: BPF scores. All predictor variables were centred on the grand mean for that variable. This allows more meaningful output from the model as the intercept will represent a participant with a mean score on each of the predictors. This is more meaningful than a participant that scored 0 for each of the predictors as for some predictors (e.g. age) 0 will not be a valid score. Using the log-likelihood statistic each model was compared to the previous to test for a significant improvement in model fit using the chi squared distribution, the significance and magnitudes of individual predictors which were then explored using beta values.

### **6.4.3. Descriptive Statistics**

Table 6.2 presents the range, mean and standard deviation scores for the current sample across all measures. The PAI-BOR mean is higher than has been reported in previous student samples (M=26.71; Gardner & Qualter, 2009; M=27.23; Trull, 1995), whilst the PDQ-BOR was comparable (M=3.26; Gardner & Qualter, 2009). Regarding mood

scores above 16 on the CES-D (Radloff, 1977) depression measure and above 15 on the GAD (Spitzer et al, 2006) are considered be high and indicate increased risk of mood disorder. Therefore it appears that there are high levels of mood disturbance within the current sample. Emotion regulation self-efficacy scores are higher than reported in other undergraduate samples (M=15-16; Salsman & Linehan, 2012) indicating higher levels of emotion regulation self-efficacy.

#### 6.2 Range, Mean and Standard Deviation Scores for All Questionnaires Administered in Study 2b

	Range	Mean (S.D)
Age	18-43	22.31 (5.66)
PDQ-BOR	0-9	3.38 (2.33)
PAI-BOR	10-67	34.75 (12.24)
BPF	5-39.5	20.76 (8.05)
Depression Score	3-50	20.88 (11.37)
Anxiety Score	7-28	15.48 (5.40)
Anti-social Personality	0-6	1.33 (1.36)
Histrionic Personality	0-8	2.88 (1.89)
Narcissistic Personality	0-6	2.12 (1.53)
Emotion Regulation Self Efficacy	8-40	22.10 (8.34)

#### 6.4.4. Results for Real-Time Emotion Intensity

The aim here was to investigate whether BPF predicts real-time emotion intensity, which is emotion intensity at the time of regulation, after controlling for demographic variables, co-morbidity factors and general emotion intensity. Negative and positive emotion intensity was explored individually, starting with negative.

First the structure of the data was explored using a single level null model and multi-level Variance Components Model (VCM) (Table 6. 2). The 3-level model was found to demonstrate a significantly better fit than the single level model,  $\chi^2 (2) = 705.10, p < .001$ . The focus of the current study was on between- person differences, therefore analyses focused on explaining person level variance. The variance component model (VCM) demonstrates clustering at all three levels, with 49% of the variance in real time negative emotion intensity being accounted for at the person level, 12% at the day level and 38% at the prompt level. Together these findings suggest that a 3 level model is appropriate for this research question and therefore predictors were added to the three level models. Results are presented in Table. 6.2.

Table 6.3. Multi-level Hierarchical Multiple Regression for Real-Time Negative Emotion Intensity

	SLM		3 level VCM			Model 1		Model 2		Model 3		Model 4		Model 5	
	VC	SE	VC	SE	ICC	B	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE
Cons	17.72	.19	17.79	.53		15.89	1.21	17.33	1.03	16.81	1.03	16.76	.73	.77	.81
Age						-.00	.00	-.00	.00	-.00	.00	-.00	.00	-.00	.00
Gender						2.35	1.35	.62	1.15	1.25	1.15	.84	.81	.77	.81
Depression								.10	.06	.07	.06	.19	.09	.00	.04
Anxiety								.38	.13	.33	.13	.03	.04	.14	.09
PDQ-AS										.58	.36	.56	.25	.34	.29
PDQ-HIS										.15	.27	.11	.19	.04	.19
PDQ-NAR										.37	.34	.27	.24	.19	.25
Negative Emotion Intensity												.58	.02	.58	.02
BPF Total														.06	.04
<u>Residuals</u>															
Participant level	49.89	1.93	24.72	3.98	.49	23.35	1.21	15.17	2.64	13.87	2.43	6.48	1.18	6.36	1.18
Day Level			6.57	1.09	.08	6.57	1.09	6.52	1.08	6.23	1.08	2.79	.665	2.80	.66
Prompt level			19.65	.984	.41	19.65	.98	19.71	.99	19.77	.99	14.62	.728	14.60	.73
-2*Log Likelihood	9001.35		8295.35			8292.33		8256.13		8248.75		7657.41		7654.83	

*Note.* Abbreviations are as follows VC=Variance component, ICC= Intra-class correlation, SE=standard error PDQ-AS= Antisocial Personality score, PDQ-HIS= Histrionic Personality Score, PDQ-NAR= Narcissistic Personality Score, BDF Total= Aggregated Borderline Personality Scores

The addition of demographic variables in Model 1 was not found to significantly improve the model fit, indicating that age and gender do not predict real-time negative emotion intensity. In Model 2, anxiety and depression were added as predictors in the model. This led to a significant improvement in model fit,  $\chi^2 (2) = 36.20, p = .008$ , explaining 35% of the participant level variance in real-time negative emotion intensity. Looking at the parameter estimates in Model 2, the strongest predictor was anxiety score, which demonstrated a positive predictive relationship. This suggests that more anxious individuals regulate their negative emotions when they are more intense. In Model 3 the inclusion of other cluster B personality scores explained 9% of the participant level variance after controlling for demographic and mood variables but did not significantly improve model fit,  $\chi^2(3) = 7.38, p = .06$ . Model 4 added general negative emotion intensity as a control variable to ensure that findings were for intensity at the point of regulation rather than overall emotion intensity. This explained 53% of the remaining participant level variance and significantly improved the model fit,  $\chi^2 (1) = 591.34, p < .001$ . Beta values demonstrate that general negative emotion intensity was a positive predictor. After controlling for all other variables the addition of BPF Score in Model 5 did not significantly predict unique variance in negative affect at the time of emotion regulation,  $\chi^2 (1) = 2.58, p = .108$ . This suggests that BPF scores do not demonstrate a unique relationship with the intensity of negative emotion when it is regulated.

However, it was considered that the inclusion of mood disturbances and cluster B personality scores as control variables may have been too stringent. Theoretically this is because the borderline personality diagnosis and therefore BPF includes some aspects of mood disturbance, such as marked reactivity of mood or depressivity (American Psychiatric Association, 2000, 2013). In addition all cluster B personality disorders are grouped together as they share common features such as dramatic

emotional behaviour (American Psychiatric Association, 2000). Therefore it was theorised that the inclusion of these variables may be too stringent masking the effects of BPF. This theoretically driven consideration was also supported by statistical findings. It was found that BPF demonstrated a medium to strong positive relationship with each individual cluster B score, depression and anxiety scores (Table 5.2). Although the strength of these relationships was not sufficient to violate the assumption of multicollinearity, less than perfect collinearity may still cause statistical problems in providing accurate estimates for independent variables (Berry, 1993). To explore this, the full model was re-run twice, once removing depression and anxiety scores and once removing cluster B personality scores. Following the removal of cluster B personality scores, BPF becomes a highly significant predictor of the intensity of negative emotion at the point of regulation,  $X^2(1) = 10.84, p < .001$ , whilst controlling for demographics, depression and anxiety, and general negative emotion intensity. The removal of depression and anxiety scores from the model also lead to BPF becoming a highly significant predictor,  $X^2(1) = 11.26, p = .001$ , whilst controlling for demographics, cluster B personality scores, and general negative emotion intensity. This demonstrates that BPF score does predict real-time negative emotion intensity; however this relationship may not be exclusive to BPF and instead may result from shared cluster B personality features and mood disturbance. This will be further considered in the discussion section.

#### *Real-Time Positive Emotion Intensity*

To assess the structure of the data, a single level null model and three level variance components model were computed and compared (Table 6. 3). The three level model demonstrated a significantly better model fit than the single level model,  $X^2(2) = 210.44, p < .001$ . The three level VCM indicated that 52% of the variance was at the prompt level, 14% was at the day level, 34% was at the person level. Together these findings support the use of a three level model. Predictors were then added into the

model starting with the standard control variables (Models1-3), general positive emotion intensity was added as a control variable in Model 4 and the variable of interest, BPF score, was added in Model 5.

The addition of demographic variables in Model 1 significantly improved the overall model fit,  $\chi^2 (2) = 135.89, p < .001$ , explaining 1% reduction of the participant level variance. The addition of mood score in Model 2 did not significantly improve model fit,  $\chi^2 (2) = 1.25, p = .534$ . This suggests that the presence of mood disturbance does not predict real-time positive emotion intensity. The addition of cluster B personality scores in Model 3 significantly improved the overall model fit,  $\chi^2 (3) = 12.87, p = .005$ , explaining 22% of the between participant variance. Examination of the beta values indicates that this was driven by the inclusion of histrionic and narcissistic personality scores, which were found to be significant positive predictors. This indicates that individuals demonstrating cluster B personality pathology, particularly histrionic and narcissistic personality traits, regulate their positive emotions at higher emotion intensities. The inclusion of general positive emotion intensity in Model 4 significantly improved model fit,  $\chi^2 (1) = 335.56, p < .001$ , explaining 45% of the remaining participant level variance after controlling for demographics, mood and cluster B personality scores. The inclusion of BPF scores in Model 5 did not significantly improve model fit,  $\chi^2 (1) = .106, p = .745$ .

Consistent with analyses exploring real-time negative emotion regulation intensity the model was re-run twice: once excluding cluster B personality scores and once removing depression and anxiety scores. However, BPF was not found to be a significant predictor of real-time positive emotion intensity following the removal of cluster B personality scores,  $\chi^2 (1) = 2.89, p = .089$ , or depression and anxiety scores,  $\chi^2 (1) = .17, p = .684$ . This further supports the finding that individuals with high levels of



BPF do not differ from those with low levels of BPF on the intensity of positive emotion at the point of regulation.

Table 6.4. Multi-level Hierarchical Multiple Regression for Real-time Positive Emotion Intensity

	SLM		3 Level VCM			Model 1		Model 2		Model 3		Model 4		Model 5	
	VC	SE	VC	SE	ICC	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE
Cons	26.97	.32	6.97	.65		27.09	0.71	27.16	0.71	27.07	0.65	26.26	0.50	26.26	0.50
Age						0.06	0.11	0.04	0.11	0.04	0.10	0.04	0.07	0.04	0.07
Gender						0.10	1.77	0.13	1.82	0.16	1.72	-1.01	1.30	-0.96	1.307
Depression								-0.09	0.09	-0.13	0.09	-0.05	0.07	-0.05	0.07
Anxiety								0.08	0.21	0.01	0.19	-0.04	0.15	-0.06	0.15
PDQ-AS										0.21	0.49	0.27	0.37	0.19	0.44
PDQ-HIS										0.79	0.38	0.68	0.29	0.66	0.29
PDQ-NAR										0.73	0.48	0.15	0.37	0.12	0.38
General Positive Emotion Intensity												0.55	0.03	0.55	0.03
BPF Total														0.02	0.06
<u>Residuals</u>															
Participant level			26.85	5.54		26.53	5.55	25.99	5.47	20.15	4.57	10.98	2.57	10.98	2.57
Day Level			11.21	3.03		11.35	3.04	11.34	3.04	11.49	3.05	3.02	1.85	3.02	1.85
Prompt level	79.02	4.04	41.49	2.93		40.67	2.91	40.67	2.90	40.74	2.90	32.26	2.26	32.26	2.26
-2*Log Likelihood	5506.55		5296.11			5160.22		5158.96		5146.09		4810.53		4810.43	

*Note.* Abbreviations are as follows VC=Variance component, ICC= Intra-class correlation, SE=standard error PDQ-AS= Antisocial Personality score, PDQ-HIS= Histrionic Personality Score, PDQ-NAR= Narcissistic Personality Score, BDF Total= Aggregated Borderline Personality Scores

#### **6.4.5. Results for Duration of Emotion Regulation Attempts**

The purpose of these analyses was to investigate whether BPF predicts the duration of emotion regulation attempts after controlling for age, gender, mood disturbance and other cluster B personality features. The duration of negative and positive emotion regulation attempts were analysed separately and are presented here starting with the duration of negative emotion regulation.

##### *Duration of Negative Emotion Regulation*

Single level and three -level variance component models were calculated (Table 6. 4) for negative ER duration to establish the level of clustering and the need for a multi-level model. The three level model was found to demonstrate a significantly better fit than the single level model,  $X^2(2)=48.59$ ,  $p < .001$ , indicating that 10% of the duration of negative emotion regulation is at the participant level, 2% at the day level and 88% at the Prompt level. This demonstrates that a three-level model a better fit for this dataset. As BPF is a person level variable, the current set of analyses are focused on explaining the person level variance.

The model was then systematically built by adding predictors, starting with the standard control variables in Models 1-3, Model 4 adds variable of interest: BPF score. Findings are displayed in Table 6.4. The addition of demographic variables in Model 1 explained 40% of the participant level variance and significantly improved the model fit,  $X^2(2) = 372.73$ ,  $p < .001$ . Beta values indicate that age demonstrates a significant positive predictive relationship suggesting that older people spent longer regulating their negative emotions. The addition of mood disturbance scores in Model 2 explained 16% of the remaining participant level variance and significantly improved the overall model fit,  $X^2(2)=7.47$ ,  $p = .023$ , suggesting that mood disturbance impacts on the duration of negative emotion regulation. The addition of cluster B personality scores in Model 3 explained 8% of the remaining participant level variance and did not

significantly improve model fit,  $\chi^2(3)=3.65$ ,  $p= .302$ , suggesting that cluster B personality pathology does not impact on the amount of time spent regulating negative emotions. The addition of BPF scores in Model 4 explained <1% of the remaining variance at the participant level, however, this did not significantly improve the model fit,  $\chi^2 (1) =.17$ ,  $p=.680$ . This finding remained following the exclusion of cluster B personality scores,  $\chi^2 (1) =.02$ ,  $p=.876$ , and depression and anxiety scores,  $\chi^2 (1) = 1.06$ ,  $p= .097$ . This suggests that the presence of BPF does not impact on the amount of time individuals spend attempting to regulate negative emotions.

#### *Duration of Positive Emotion Regulation*

A single and three level VCM were computed to explore the structure of the data and the need for a multi-level model. The three level model provided a significantly better model fit,  $\chi^2 (2) =87.03$ ,  $p< .001$ , 26% of the variance was found to be at the participant level, 0% at the day level and 74% at the prompt level. As no variance was clustered at the day level, this level was removed to allow a more parsimonious model. The addition of demographic variables in Model 1 significantly improved model fit,  $\chi^2 (2) =233.29$ ,  $p< .001$ , explaining 35% of the participant level variance. The beta values indicate that both age and gender (male) demonstrate a negative predictive relationship with the duration of positive emotion regulation. This suggests that older people and males spend less time regulating their positive emotions. The addition of mood scores in Model 2 significantly improved the model fit,  $\chi^2 (2) =7.23$ ,  $p= .023$ , explaining 11% of the remaining participant level variance. The strongest individual predictor was depression score, which demonstrated a positive predictive relationship suggesting that individuals with higher levels of depression spend more time regulating positive emotion. The addition of cluster B personality scores in Model 3 explained 7% of the remaining participant level variance but did not significantly improve model fit,  $\chi^2(3)=4.14$ ,  $p= .246$ . The addition of BPF in Model 4 significantly improved model fit,

$\chi^2(1) = 4.11, p = .042$ , explaining 9% of the participant level variance. The beta values indicate that this is a negative predictive relationship suggesting that individuals with high levels of BPF spend less time regulating their positive emotions.

It was hypothesised earlier that low emotion regulation self-efficacy may result in shorter durations of emotion regulation and that the DERS '*strategies*' subscale scores (Gratz & Roemer, 2004) may be used as an indication of emotion regulation self-efficacy. Therefore the DERS '*strategies*' subscale was explored as a potential mediator in the relationship between BPF and the duration of positive emotion regulation. In order for a mediation effect to be present both the predictor (BPF score) and the potential mediator (DERS strategies) must significantly predict the outcome (Field, 2009). However, DERS strategies was not found to be a significant predictor of the duration of positive emotion regulation,  $\chi^2(1) = 1.32, p = .251$ . This suggests that DERS strategies, as a proxy for emotion regulation self-efficacy does not mediate the relationship between BPF and duration of positive emotion regulation.

Table 6.5. Multi-level Hierarchical Multiple Regression for Duration of Negative Emotion Regulation

	SLM		3 level VCM			Model 1		Model 2		Model 3		Model 4	
	VC	SE	VC	SE	ICC	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE
Cons	28.78	1.21	29.65	1.94		27.77	1.83	27.38	1.76	27.23	1.74	27.24	1.74
Age						-0.49	0.27	-0.51	0.26	-0.52	0.25	-0.52	0.26
Gender (male)						6.40	4.41	8.84	4.36	9.55	4.43	9.60	4.44
Depression								0.13	0.22	0.12	0.22	0.11	0.24
Anxiety								0.66	0.49	0.56	0.48	0.55	0.50
PDQ-AS										-1.12	1.35	-1.22	1.58
PDQ-HIS										1.41	1.00	1.39	1.02
PDQ-NAR										0.60	1.32	0.54	1.38
BPF Total												0.30	0.22
<u>Residuals</u>													
Participant level			202.52	50.55	.10	120.46	37.75	100.71	34.60	92.80	33.33	92.80	33.34
Day Level			29.11	55.00	.02	39.72	52.95	35.23	52.66	34.05	52.51	34.07	52.53
Prompt level	1920.79	75.28	1703.82	83.42	.88	1601.40	79.18	1605.43	79.27	1605.86	79.28	1605.83	79.27
-2*Log Likelihood	13538.67		13490.09			13117.27		13109.80		13106.15		13106.14	

*Note.* Abbreviations are as follows VC=Variance component, ICC= Intra-class correlation, SE=standard error PDQ-AS= Antisocial Personality score, PDQ-HIS= Histrionic Personality Score, PDQ-NAR= Narcissistic Personality Score, BDF Total= Aggregated Borderline Personality Scores

Table 6.6. Multi-level Hierarchical Multiple Regression for Positive Emotion Regulation Duration.

	SLM		3 level VCM		Model 1		Model 2		Model 3		Model 4		Model 5		
	VC	SE	VC	SE	ICC	β	SE	β	SE	β	SE	B	SE	β	SE
Cons	42.10	2.32	43.26	4.30		43.04	4.10	42.12	3.96	42.35	3.89	42.18	3.80	42.29	3.86
Age						-0.75	0.60	-0.62	0.59	-0.54	0.58	-0.39	0.57	-0.54	0.57
Gender						-7.32	10.07	-6.93	9.99	-10.25	10.11	-12.39	9.90	-12.84	10.27
Depression								1.05	0.51	0.89	0.51	1.23	0.53	1.18	0.57
Anxiety								-0.54	1.16	-0.57	1.14	0.05	1.15	-0.54	1.13
PDQ-AS										1.50	2.95	5.28	3.42	2.32	3.01
PDQ-HIS										-2.03	2.24	-1.23	2.22	-1.54	2.26
PDQ-NAR										5.15	2.92	6.61	2.93	5.46	2.91
BPF Total												-1.01	0.49		
Self-Efficacy														-0.76	0.66
<u>Residuals</u>															
Participant level			1102.90	238.39	.26	721.69	176.93	639.82	162.75	592.55	154.87	544.48	146.72	575.57	152.47
Prompt level	4012.72	207.63	3075.93	168.81	.74	2975.06	164.88	2970.14	164.56	2968.38	164.39	2967.88	164.30	2968.68	164.34
-2*Log -L	8317.92		8230.89			7997.61		7990.40		7986.26		7982.14		7984.94	

#### **6.4.6. Exploring the Likelihood of an Emotion Regulation Attempt Occurring**

On each prompt participants were asked whether or not they made an active attempt to alter the emotion that they had reported experiencing; this was done by responding ‘yes’ or ‘no’. As a result active emotion regulation is a binary variable. In order to explore the impact of BPF on the likelihood of individuals actively attempting to regulate their emotions a multi-level binary logistic regression model was used. As the outcome variable is binary the assumption of linearity is violated (Berry, 1993). Therefore the binary response is transformed using a logit link function (i.e. the odds that  $y=1$ ). In multi-level modelling the computation of discrete responses using maximum likelihood estimation is computationally intensive therefore the MLwiN software implements quasi-log likelihood methods (Rasbash et al., 2012). However, this means that the log-likelihood value is no longer reliable and is not produced. As a result the log likelihood test cannot be used to assess changes in model fit. Instead the model will be interpreted by looking at the percentage of participant level explained by each model and the Wald test for individual predictors and variance parameters, as recommended by Rasbash et al., (2012). However, the Wald test must only be used as a guide as variance parameters are not normally distributed. Consistent with previous models predictors were added in blocks: Model 1 added age and gender, Model 2 added depression and anxiety, Model 3 added cluster B personality scores and Model 4 added BPF total scores.

##### *Exploring the data structure*

In previous models where log likelihood ratios were produced the data was explored by comparing the model fit of single verses multi-level models. As previously discussed, in the case of multi-level binary logistic regression the log-likelihood value is unreliable and cannot be used. Therefore a three level model was used, driven by the



theoretical assumption that the probability of regulation emotions may vary by person, and day and a Wald test was used to explore the significance of variance at each level.

*Likelihood of negative emotion regulation attempt*

Findings for the likelihood of a negative emotion regulation attempt are displayed in Table 6.6. There was no variance explained at the day level therefore this level was removed from the model. As previously discussed, the log-likelihood statistic is likely to be unreliable due to the use of quasi log-likelihood methods of estimation. Therefore a Wald test was used to explore the significance of variance at the person level (Rasbash et al., 2012). A Wald test indicated significant variance at the person level,  $\chi^2(1) = 29.57, p < .001$ . This indicated that the probability of regulating negative emotions varied between people after controlling for between prompt variance. As a result a two level model was required. Variables were then added to the model to identify which variables predict the between person variance.

Model 1 included age and gender as predictor variables explaining 9% of the variance. Model 2 added depression and anxiety scores as predictor variables and explained <1% of the remaining participant. Model 3 added cluster B personality scores into the model and explained 5% of the remaining participant level variance. Model 4 added BPF score explaining 1% of the variance.

The final model showed only two individual significant predictors of a negative emotion regulation attempt occurring: gender and histrionic personality score. This suggests that males compared to females were significantly less likely to actively regulate their negative emotions,  $\chi^2(1) = 8.62, p = .003$ , and individuals with high levels of histrionic personality features were significantly less likely to reported regulating negative emotions,  $\chi^2(1) = 4.31, p = .038$ . BPF score did not predict the likelihood of a negative emotion regulation attempt occurring. However, there is still a significant

amount of unexplained variance at the person level indicating that the cumulative effect of variables included in this model is not sufficient to determine whether or not an emotion regulation attempt will occur.

Table 6.7. Multi-level Binary Logistic Regression for the Likelihood of a Negative Emotion Regulation Attempt

	Null Model		Model 1		Model 2		Model 3		Model 4	
	VC	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE
Cons	-0.37	0.08	-0.26	0.09	-0.25	0.09	-0.25	0.09	-0.25	0.09
Age			0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Gender			-0.54	0.20	-0.58	0.20	-0.60	0.21	-0.61	0.21
Depression					0.00	0.01	0.00	0.01	0.01	0.01
Anxiety					-0.02	0.02	-0.02	0.02	-0.02	0.03
PDQ-AS							0.02	0.07	0.05	0.07
PDQ-HIS							0.09	0.05	0.10	0.05
PDQ-NAR							-0.06	0.06	-0.05	0.06
BPF Total									-0.01	0.01
<u>Residuals</u>										
Participant level	0.48	0.09	0.44	0.08	0.44	0.08	0.41	0.08	0.41	0.08

#### *Likelihood of a positive emotion regulation attempt*

The same analyses that were used to explore the likelihood of a negative emotion regulation, reported above, were also used to explore the likelihood of a positive emotion regulation attempt taking place. When exploring the data structure no variance was found at the day level indicating that the likelihood of an emotion regulation attempt occurring did not vary across days. As a result this level was removed to provide a more parsimonious model. A Wald test suggested that significant variance was present at the person level, suggesting that participants significantly

differed from each other on how likely they were to report attempting to regulate positive emotions. Person was therefore included as a level in the model, resulting in a 2-level structure: prompt and person. Variables were then added to the model in an attempt to explain the between person variance.

Model 1 included age and gender as predictor variables explaining 2% of the between person variance. Model 2 added depression and anxiety scores as predictor variables and explained an 8% of the remaining person level variance. Model 3 added cluster B personality scores into the model and explained 5% of the remaining participant level variance. Model 4 added BPF explaining <1% of the remaining person-level variance.

The final model included two significant individual predictors: depression score and anxiety score. This suggests that individuals with high levels of depression were more likely to report actively regulating their positive emotions,  $\chi^2(1) = 6.68, p = .010$ , and individuals with high levels of anxiety were significantly less likely to report actively regulating their positive emotions,  $\chi^2(1) = 5.89, p = .015$ . However, there is still significant unexplained variance at the person level indicating that the cumulative effect of variables included in this model are not sufficient to be able to determine whether or not a positive emotion regulation attempt will occur.

Table 6.8. Multi-level Binary Logistic Regression for the Likelihood of a Positive Emotion Regulation Attempt

	Null Model		Model 1		Model 2		Model 3		Model 4	
	VC	SE	$\beta$	SE	$\beta$	SE	B	SE	$\beta$	SE
Cons	-1.44	0.13	-1.36	0.14	-1.36	0.14	-1.36	0.13	-1.36	0.13
Age			0.02	0.02	0.03	0.02	0.03	0.02	0.03	0.02
Gender			-0.44	0.33	-0.51	0.33	-0.52	0.33	-0.53	0.33
Depression					0.05	0.02	0.04	0.02	0.05	0.02
Anxiety					-0.09	0.04	-0.10	0.04	-0.10	0.04
PDQ-AS							-0.00	0.10	0.02	0.12
PDQ-HIS							0.07	0.08	0.08	0.08
PDQ-NAR							0.12	0.10	0.13	0.10
BPF Total									-0.01	0.02
<u>Residuals</u>										
Participant level	1.28	0.22	1.25	0.22	1.15	0.21	1.09	0.20	1.09	0.20

### 6.5. Summary of main findings

Findings revealed that BPF score was not found to predict the likelihood of positive or negative emotion regulation attempts being reported. This suggests that individuals with higher levels of BPF are no more or less likely to consciously try and regulate their emotions than individuals with lower levels of BPF. When they do attempt to regulate their emotions it was found that individuals with higher levels of BPF attempt to regulate their negative emotion when emotion intensity is higher. However, the significant relationship between BPF and negative emotion intensity at the point of regulation was only present when other cluster B personality scores or mood disturbance scores were not controlled. This suggests that this finding may not be specific to BPF. BPF was not found to be predictive of the reported durations of

negative emotion regulation attempts. No relationship was found between BPF and the intensity of positive emotions at the time of regulation, suggesting that individuals with high and low levels of BPF do not differ in the intensity of positive emotions when regulation is attempted. However, BPF demonstrated a significant negative relationship with the reported duration of positive emotion regulation attempts. This suggests that when individuals with higher levels of BPF attempt to regulate their positive emotions they do so for a shorter period of time. This relationship was not mediated by self-efficacy (as indicated by the DERS strategies subscale).

## **6.6. Discussion**

In the past research has highlighted several features in the implementation of emotion regulation strategies that have a major impact on emotion regulation success. The aim of this study was to investigate some of these features in relation to BPF. These features are the likelihood of effortful emotion regulation attempts occurring, the intensity of emotion at the time of its regulation (real time emotion intensity) and the duration of emotion regulation attempts. Exploratory analyses revealed that, consistent with past research (Gross et al., 2006), emotion regulation attempts were focused on reducing negative emotions and increasing or maintaining positive emotions. The data structure revealed that individual differences were apparent in all six dependent variables: positive and negative emotion intensity at the point of regulation, the duration of positive and negative emotion regulation attempts and the likelihood of positive and negative emotion regulation attempts occurring. Findings revealed that the BPF score was not found to predict the likelihood of an emotion regulation attempt for positive or negative emotions. When emotion regulation attempts took place, the BPF score was predictive of negative emotion intensity at the time of regulation, with individuals scoring highly on BPF regulating at higher intensities. However BPF was not predictive of the duration of negative emotion regulation attempts. For positive

emotions it was found that BPF did not predict the intensity of positive emotions at the time of their regulation. However BPF was predictive of the duration of positive emotion regulation attempts, with individuals with higher levels of BPF reporting shorter durations of positive emotion regulation. Each of these findings is now discussed in further detail.

#### **6.6.1. Likelihood of an Emotion Regulation Attempt Occurring**

Findings indicated that the BPF score does not influence the likelihood of individuals making active attempts to regulate their positive or negative emotion responses. This means that individuals with high levels of BPF make effortful attempts to regulate their emotions as often as those with low level of BPF. In light of this it is likely that emotional difficulties associated with BPF are as a result of disturbances in the process of emotion regulation rather than a lack of effort to regulate emotions. This is consistent with biosocial theory, which suggests that these individuals make inappropriate attempts to regulate their emotions due to deficits in emotion regulation skills and knowledge (Linehan, 1993). Further findings in this study highlight a number of features in the negative and positive emotion regulation process that may be problematic for individuals experiencing high levels of BPF, as discussed below.

#### **6.6.2. Negative Emotion Regulation**

Findings from analyses focusing on negative emotion regulation suggest that individuals with high levels of BPF are more likely to regulate their emotions when negative emotion intensity is high. However, this finding was only significant when other cluster B personality features or mood disturbance scores had been excluded from the model; this issue is later discussed as a potential study limitation.

According to appraisal theories the intensity of an emotion builds throughout the generation process as more appraisals are made, leading the activation of individual components of an emotion response (Scherer, 2013). Consistent with this, the process

model of emotion regulation suggested that response-focused strategies, which occur later in the process of emotion generation, are likely to be less effective due to high emotional intensity (Gross, 1998a). Considering past theory, the finding that individuals with high levels of BPF regulate their emotions when emotion intensity is high may be taken as an indication that individuals with high levels of BPF are regulating their emotions later in the emotion generative process.

One possible explanation for these individuals regulating their emotion later is that they do not detect the emotion as a cause for action until the emotion becomes intense. This explanation is consistent with biosocial theory, which suggests through constant invalidation these individuals learn to ignore their internal emotional responses (Linehan, 1993). In addition empirical research has demonstrated that individuals with severe levels of BPF, sufficient for a diagnosis of BPD, demonstrate poor awareness of their own emotions (Levine et al., 1997). Therefore these individuals may be less aware of the emotion as it develops and therefore only attempt to regulate emotions when they enter consciousness as intense emotional responses.

An alternative explanation is that these individuals choose not to regulate emotion due to feelings of helplessness, which has previously been reported in this population (Fletcher et al., 2014; Glenn & Klonsky, 2009; Salsman & Linehan, 2012). In practical terms and consistent with self-efficacy theory (Bandura, 1977), this might mean that individuals with high levels of BPF do not make attempts to regulate emotions as they do not believe their attempts will be successful. However, as the emotion intensity builds and becomes unbearable individuals may then attempt to regulate the unwanted negative emotion. It is beyond the findings of this study to speculate which of these explanations is the likely cause of regulation attempts being

conducted when high emotion intensity is higher and this is an area in need of future research.

Whatever the underlying cause, the finding that individuals with higher levels of BPF attempt to regulate their negative emotions when they are more intense makes an important addition to past research, which has reported a general increase in negative emotion intensity in this population (e.g. Ebner-Priemer et al., 2007; Zeigler-Hill & Abraham, 2006). This is because theoretically the identification of high emotion intensity at the point of an emotion regulation attempt, suggests that high emotion intensity may be an underlying cause as well as consequence of poor emotion regulation. This is consistent with Linehan's biosocial theory, which suggests that emotion intensity increases the demand for effective emotion regulation (Linehan, 1993). Empirical findings in the emotion regulation literature also support this argument by showing that regulating negative emotion when intensity is high reduces the impact of helpful cognitive change strategies such as reappraisal (Sheppes & Meiran, 2007). Thus the finding that individuals with high levels of BPF choose to regulate their emotions when intensity is high may help to explain why emotion regulation is problematic for these individuals.

Further to this, regulation during high emotion intensity has been found to increase the likelihood of individuals choosing to use disengaging emotion regulation strategies, such as distraction (Sheppes et al., 2012). Therefore the finding in this study that individuals with high levels of BPF attempt to regulate their emotions during higher levels of emotion intensity, implies that these individuals are more likely to engage in disengagement strategies. This is consistent with past research reporting that individuals with high levels of BPF engage in deliberate self-injury to distract themselves from unwanted negative emotions (Brown et al., 2002; Paris, 2005). Therefore, it is theorised



that higher emotion intensity at the point of regulation may be an important influential factor in the selection of unhelpful disengagement strategies. This is consistent with the Emotion Cascade Model (Selby & Joiner, 2009) and supporting research (Selby et al., 2009; Selby & Joiner, 2013), which suggest that extreme forms of behavioural dysregulation, such as deliberate self-injury, substance use, and excessive reassurance seeking, are used by individuals with BPD as a distraction strategy when emotion becomes too intense (Selby et al., 2009; Selby & Joiner, 2009, 2013).

The research discussed above suggests that if individuals with high levels of BPF attempt to regulate their negative emotions when they are more intense, as reported in section 6.4.3 (Table 6.2), this is likely to have two unhelpful consequences for emotion regulation. Firstly it may limit the success of some emotion regulation attempts, leading to the continuation of intense negative emotion. Secondly it encourages the use of disengaging strategies, such as distraction.

Then again, it may be argued that the tendency for individuals with high levels of BPF to select more disengaging strategies represents an appropriate response to situational demands. This is because during intense emotion, disengaging strategies are likely to be the most effective strategies for rapidly reducing the unwanted negative emotion (Sheppes & Meiran, 2007). This is in line with research suggesting that individuals with high levels of BPF have sufficient knowledge of emotion regulation strategies and are able to select them effectively according to situational demands (Beblo et al., 2010). However, as highlighted in biosocial theory (Linehan, 1993) and elsewhere in the literature (Garland, Fox, & Williams, 2002), the repeated use of disengaging strategies can be problematic both directly and indirectly. The direct effects are more obvious, such as self-injury causing physical health problems, or aggression leading to interpersonal problems. Indirectly disengaging strategies may be unhelpful

as they prevent individuals from learning how to deal with the emotion if it occurs again in the future, thus reducing emotion regulation self-efficacy (Garland et al., 2002; Linehan, 1993). This is because disengaging strategies have been found to inhibit memory of the emotional situation (Richards & Gross, 2000). In addition disengaging strategies may involve avoiding situations or aspects of situation that may also be pleasurable. It is for these reasons that engaging strategies, such as reappraisal, are also required to promote helpful long term emotion regulation.

Reappraisal can still be effective during high emotional intensity if used for a longer period of time (Sheppes & Meiran, 2007), indicating that emotion regulation during high emotion intensity necessitates longer regulation periods. As individuals with high levels of BPF have been found to attempt emotion regulation when emotion intensity is higher, they would need to regulate for longer periods of time in order for engagement strategies to be successful. However, this was not the case: findings from this study show that BPF was not a significant predictor of the duration of emotion regulation attempts. Together these findings indicate that individuals with high levels of BPF may experience difficulty when regulating negative emotions as they attempt emotion regulation later in the generation process when emotion intensity is high, but they do not demonstrate an increase in the duration of emotion regulation, which may be necessary for emotion regulation success under high emotion intensity.

### **6.6.3. Positive Emotion Regulation**

In addition to highlighting potential disruptions in negative emotion regulation processes, the current findings indicate one area of positive emotion regulation that may be problematic: individuals with high levels of BPF appear to spend less time actively attempting to regulate their positive emotions. Furthermore this latter finding was present after controlling for demographics, cluster B personality pathology, and mood disturbance and emotion intensity, suggesting a high level of specificity to BPF. This

finding supports biosocial theory (Linehan, 1993), which suggests that individuals with high levels of BPF experience difficulty regulating their positive emotions, and builds on this by highlighting one area of the positive emotion regulation process that may be disrupted in individuals with high levels of BPF.

Based on past literature it was theorised that reduced duration of emotion regulation attempts may occur as a result of low emotion regulation self-efficacy. Low self-efficacy, as indicated by the strategies subscale of the DERS (Gratz & Roemer, 2004), has previously been associated with the presence of BPF and BPD (Fletcher et al., 2014; Glenn & Klonsky, 2009; Salsman & Linehan, 2012). As a result self-efficacy was explored as a possible mediator in the relationship between BPF and duration of positive emotion regulation attempts. Findings indicated that self-efficacy was not a significant predictor of the duration of positive emotion regulation, and therefore could not be a mediating factor between BPF and the duration of negative emotion.

An alternative explanation is that individuals with high levels of BPF spend less time on positive emotion regulation because they experience difficulty maintaining focus on their positive emotional experiences due to a negative attention bias. This is consistent with past research demonstrating that individuals with a diagnosis of BPD, who demonstrate extreme levels of BPF, have difficulties disengaging from negative stimuli (Silbersweig et al., 2007). This is also consistent with the emotion cascade model and supporting research, which suggests that individuals with high levels of BPF engage in rumination and find it difficult to divert attention away from negative experiences together with their cause and consequences (Baer & Sauer, 2011; Selby et al., 2009; Selby & Joiner, 2009, 2013). It is proposed that this tendency to focus on negative aspects of situations and experiences may detract from time spent focusing on positive events and experiences. It is also acknowledged that if less attention is focused

on episodes of positive emotion regulation this may impact on memories of these episodes. Thus reporting shorter durations of positive emotion regulation attempts may be as a result of a memory bias rather than these individuals actually spending less time regulating their positive emotions.

Helpful positive emotion regulation strategies, to increase positive emotions, often require the individual to maintain attention on positive experiences or situations (Bryant, 1989). The ability to do this has been associated with several positive outcomes, such as increases in optimism, self-control and self-esteem and decreases in hopelessness and depression (Meehan, Durlak, & Bryant, 1993). It is suggested that the negative attention bias previously found in association with BPF (e.g. Domes et al., 2006; Silbersweig et al., 2007) may cause difficulty when trying to maintain focus on positive experiences and events, reducing the amount of time spent regulating positive emotions.

The ability to maintain focus on positive experiences is central to the success of helpful positive emotion regulation strategies. Therefore a decrease in the duration of positive emotion regulation may explain why individuals with high levels of BPF have been reported to experience less positive emotions and cognitions in relation to other personality disorder diagnoses (Reed & Zannarini, 2011).

#### **6.6.4. Limitations and Future Research**

Findings of this study must be considered within the context of its limitations. The study is limited by the gender split of the sample preventing the findings from being generalised across gender. However, this limitation is present across all components of study 2 and has been discussed elsewhere. Therefore, here the focus will be on limitations specific to study 2b.

Firstly, the experience sampling data was collected using a paper based diary; therefore it cannot be guaranteed that participants completed the diary when prompted. As a result there may have been longer intervals between prompts and responding, increasing the recall time and potentially impacting on the validity of the data. In order to minimise this it was emphasised to participants that all reports must be completed within 15 minutes of the prompt; however future research using electronic methods may improve the validity of the data.

Secondly, the finding that BPF predicts increased negative emotion intensity at the point of regulation was only found when either mood disturbances or cluster B personality scores were removed from the model, and therefore not controlled for. As a result, it cannot be concluded that these findings are specific to BPF and instead may be associated with co-morbid cluster B personality pathology or mood disturbance. Alternatively it may be argued that mood disturbance and features common across all cluster B personality disorders, may themselves be borderline personality features. For example, in the new DSM 5 alternative model (American Psychiatric Association, 2013) depressivity is considered to be a diagnostic feature of BPD. In addition, cluster B personality disorders are grouped together as they are *all* associated with dramatic emotional behaviour, meaning that this is a feature of BPD (American Psychiatric Association, 2000). It is therefore difficult to distinguish whether the intensity of negative emotion at the point of regulation is predicted by BPF or co morbidity factors. In order to clarify this, further research is needed to compare individuals with co-morbid diagnoses to those without.

Thirdly, the intensity and duration of emotion regulation attempts were investigated without consideration of the strategy used. Research suggests that a longer duration is required for the regulation of intense negative emotions when using

reappraisal but not distraction (Sheppes & Meiran, 2007). This indicates that while emotion intensity may necessitate the application of some strategies for longer periods of time, this may not be the case for all strategies. Therefore if the individuals with high levels of BPF were only using distraction techniques, the duration of an attempt may be of less importance. Yet if they attempted to use reappraisal to regulate intense emotions the duration of the attempt may be more important in determining success. Further research is needed to explore the interaction between strategy type, emotion intensity and duration in this population.

Fourthly, findings indicated that emotion regulation self-efficacy did not predict the duration of positive emotion regulation attempts and therefore did not mediate the relationship between BPF and duration of positive emotion regulation. However, emotion regulation self-efficacy was assessed using the strategies subscale of the DERS (Gratz & Roemer, 2004). On closer inspection this subscale focuses on self-efficacy beliefs regarding the regulation of negative emotion (e.g. upset) and may not be an accurate representation of self-efficacy beliefs regarding positive emotion regulation. Further research is required to identify whether low self-efficacy beliefs in the population are extended to positive emotion regulation and whether this impacts on the duration of emotion regulation attempts.

Finally, when exploring the likelihood for an emotion regulation attempt to occur, significant variance remained at the person level. The current study did not record data regarding the intensity of emotions that were not regulated and therefore could not control for the impact of emotion intensity of whether or not an emotion would be regulated. This may help to reduce the unexplained variance in the model. Future research is needed to identify whether the intensity of an emotion impacts on the likelihood that an individual will actively attempt to regulate it.

### **6.6.5. Conclusions and Implications**

Findings from this study indicate that individuals with high and low levels of BPF do not appear to differ in the likelihood for them to actively attempt to regulate their positive or negative emotions, as reported in section 6.6.1. Therefore it appears likely that that emotional difficulties associated with BPF are as a result of disturbances in the process of emotion regulation rather than a lack of motivation to regulate emotions. In line with this, findings reported in section 6.6.2 show that when individuals with higher levels of BPF do attempt to regulate their negative emotions, they do so later in the emotion generative process, when emotion intensity is high. Further, it was found that this is not met with an increase in the duration of regulation attempts, which may be necessary for successful emotion regulation when emotion intensity is high. As a result it is suggested that these individuals may experience limited success when using helpful engagement strategies, such as reappraisal, which facilitate long-term emotion regulation.

The findings of this study, following replication, may be useful for emotional support services within non-clinical settings e.g. educational environments. Findings suggest that individuals with high levels of BPF do not make attempts to regulate their negative emotions until they are very intense and likely to be distressing. As a result it is more likely that emotion regulation strategies will be selected that provide rapid relief from unwanted negative emotions. This is in spite of the potentially unhelpful long-term implications of these strategies, which the individual may or may not be aware of. Therefore individuals presenting to services with high levels of BPF may benefit from training in the early identification of emotional experiences to facilitate emotion regulation when emotion intensity is low.

Past literature has theorised that individuals with BPF may experience difficulty in positive emotion regulation (Linehan, 1993) and demonstrated that these individuals may experience less positive emotions (Reed & Zannarini, 2011). Findings from this study have important theoretical implications for understanding how positive emotion regulation processes are disrupted within this population. More specifically, findings reported in section 6.6.3 show that individuals with high levels of BPF spend less time actively trying to regulate their positive emotions. It is suggested here that this may be as a result of a negative attention bias, preventing the maintained attention of positive events and experiences required in positive emotion regulation. If this link is confirmed in future research, this would highlight an important target for intervention; attentional control, and would support the use of cognitive bias modification programmes for attention to help individuals with high levels of BPF (Grafton et al., 2012).



## **Chapter 7 : Study 2c- Implicit Emotion Regulation Processes and Borderline Personality Features**

### **7.1. Abstract**

This study aimed to investigate the relationship between implicit emotion regulation processes and BPF, in an attempt to identify whether implicit processes may contribute to the emotion regulation problems associated with Borderline Personality Features (BPF). Recruitment was conducted as part of a larger study including study 2a and 2b of this thesis. For inclusion in the current study (2c) participants were required to complete self-report measures on demographics, mood and personality and were asked to complete two computer-based cognitive tasks that assessed implicit evaluations regarding emotion regulation and emotion utility. The final sample for this study consisted of 90 participants that completed all of the required tasks. No relationship was found between BPF and implicit evaluations of emotion regulation. However results show that higher levels of BPF were predictive of lower implicit utility of avoidance emotions in the context of avoidance goals. This suggests that individuals with high levels of BPF are likely to try and reduce these emotions when faced with a threatening task, rather than using the emotions to their advantage.

## 7.2. Introduction

Emotion regulation is a fundamental part of everyday life. In some situations emotion regulation processes are clear conscious and monitored decisions, such as, reassuring yourself that you are capable prior to an interview; while in other situations these processes appear to be automatic, for example turning away from a gory scene in a film. The former example reflects *explicit emotion regulation* processes, which require conscious, deliberate and monitored attempts to alter emotions. The latter example reflects *implicit emotion regulation* processes, which are triggered automatically and run outside of conscious awareness.

The majority of research conducted to date, including previous studies included in this thesis, has been focused on explicit emotion regulation (e.g. Gross & John, 2003; Szasz et al., 2011). However, some types of explicit emotion regulation have been associated with cognitive costs, such as memory impairment for emotional events (Richards & Gross, 2000). Given the high demand for moment-to-moment emotion regulation in daily life it is unlikely that all emotion regulation processes occur explicitly: this would be a major demand on cognitive resources and may compromise other areas of functioning. As a result it has been suggested that some emotion regulation processes occur implicitly (Gyurak et al., 2011).

The concept of implicit emotion regulation is consistent with appraisals theories of emotion, which have suggested that a number of early appraisals involved in the generation of emotional responses may occur implicitly; without the individual's conscious awareness (Scherer, 2013). These *appraisals* are automatic evaluations of a situation in relation to an individual's goals which may be explicitly or implicitly represented. In some situations more than one goal may be present, leading to a conflict in appraisal outcomes. For example, one may want to stop pain/exhaustion, whilst still

wanting to complete a marathon. When conflict occurs it is theorised that the goal and associated appraisals, which are most strongly valued in that specific situation, will gain dominance and drive the emotional response, including behaviour (Mesquita & Frijda, 2011). Thus it is theorised that implicit valuing may shape the emotional response without the individual's conscious awareness and without the individual engaging in explicit emotion regulation processes.

The Dual Process Framework of explicit and implicit emotion regulation suggests that explicit and implicit emotion regulation processes are not mutually exclusive. Instead it is suggested that explicit processes may become implicit through habitual use of time (Gyurak et al., 2011). Consistent with this, Aarts and Dijksterhuis (2000) suggest that explicit goals and behaviours learnt in early childhood may become implicit if activated together repeatedly over time. When pursuing infrequent goals individuals are likely to consider each of the possible actions they could use, thus leading to explicit emotion regulation. However if the same goal is pursued and achieved regularly using the same behaviour, the goal-behaviour link may become implicitly represented and automatic. This means that activation of the goal in the future may automatically trigger the associated behaviour without conscious thought (Aarts & Dijksterhuis, 2000). This concept has been utilised in the field of emotion regulation (Mauss, Bunge, et al., 2007), where it is suggested that emotion regulation processes learnt in childhood, and used repeatedly over time, may become implicit. As a result situations that trigger emotion regulatory processes may lead to the automatic emotion regulation without conscious consideration.

The presence of implicit emotion regulation processes developed throughout childhood may be of particular relevance when trying to understand emotion regulation difficulties associated with BPF. According to biosocial theory (Linehan, 1993), BPD

and therefore BPF develop and are maintained partially as a result of invalidating environments during childhood, which fail to teach the individual helpful ways in which to regulate their emotions. This is supported by empirical research that demonstrates that emotion invalidation during childhood is associated with the presence of BPF and emotion regulation problems in adulthood (Hong et al., 2011; Reeves, 2007). In particular, biosocial theory (Linehan, 1993) suggests that invalidating environments are not generally accepting of negative emotion displays and such displays are disregarded. However, they may still respond to extreme displays of emotions, thus reinforcing this behaviour. As a result the child learns that when experiencing negative emotions extreme emotional displays are useful in order to gain support from their environment (Linehan, 1993). According to past theory, the habitual use of this behaviour over-time may lead to implicit representations of this goal-behaviour, driving behaviour without a conscious decision to do so. In practical terms this would mean that for individuals with high levels of BPF the presence of negative emotion may automatically trigger extreme emotion expression without the individual's conscious deliberation.

The link between implicit goals and behaviour was originally empirically explored in the broader context of self-regulation, in a series of experiments, using gender balanced student samples (Bargh et al., 2001). These experiments used priming techniques to activate implicit goals and investigated the impact this had on the individual's self-regulatory behaviours. Firstly, it was found that it was possible to implicitly activate goals without the participant's knowledge. Secondly, the implicit activation of these goals influenced how the participants performed on social co-operation and individual achievement tasks. Bargh et al. (2001) suggest that this implicit activation of goals triggers associated pre-learned knowledge structures regarding how the goal should be pursued. As such, the implicit activation of goals and associated knowledge structures may influence the individual's behaviour without their

conscious awareness. However, this study did not check for the presence of implicit goals, and as a result it is not clear that the priming techniques influenced behaviour via the *activation* of implicit goals. Instead it may be that priming made certain aspects of the behaviour more salient to the individual, thus creating rather than activating goals. It is important to note that recent attempts to replicate the findings of Bargh et al (2001) have been unsuccessful (Harris, Coburn, Rohrer, & Pashler, 2013). As a result Bargh's findings have come under criticism suggesting that the experimenters may have been aware of the priming conditions allocated to participants and inadvertently influenced their performance on tasks. However, it is argued elsewhere that non-replication should not automatically lead to speculations of false positives and instead highlights the need for further research of potential mediators, as exact replication is unlikely to be achieved (Dijksterhuis, 2014).

Nevertheless, Mauss et al. (2006) utilised this theory in the field of emotion regulation. This was done by exploring the impact of implicit evaluations of emotion control, relative to emotion expression, on experiential, behavioural and physiological emotional responses. To achieve this, physiological and behavioural responses to an anger provocation task were recorded in a sample of 42 female students. Following the task participants were required to provide reports on their emotional experiences and any explicit attempts they made to alter their emotions. Participants were invited back an average of 26 days later to be assessed for implicit evaluations of emotion regulation using a variant of the Implicit Association Task (IAT; Greenwald et al., 1998): the Emotion Regulation Implicit Association Task (ER-IAT; Mauss et al., 2006). This task requires participants to categorise emotion control or expression words with positive or negative words as quickly and accurately as possible. Faster response times indicate stronger associations. For example shorter reaction times when categorising emotion control words together with positive words would be taken as an indication that emotion

regulation was positively valued. Therefore, in contrast to Bargh et al (2001), this study explored implicit values already held by the individuals rather than attempting to experimentally induce implicit values. Findings revealed that the presence of positive implicit valuing of emotion expression was associated with increased experience of anger, more negative thoughts and a heightened cardiovascular response. Further, this was not associated with increased use of explicit emotion regulation strategies, suggesting that the change in emotional responses occurred implicitly (Mauss et al., 2006). These findings suggests that implicitly held values of emotion expression as a positive construct, relative to emotion control, lead to unfavourable emotional responses. However, critically, the findings reported by Mauss et al. (2006) are based solely on correlation analyses, which do not allow attribution of causality.

However, this has also been explored using experimental manipulation of implicit goals via priming to test their associated affective consequences (Mauss, Cook, et al., 2007). Findings revealed that individuals primed for expression demonstrated significantly higher anger experience following an anger provocation task. Further to this individuals primed for control demonstrated less anger experience, less global negative affect and no differences with cardiovascular responding. This suggests that implicit valuing of emotion control rather than emotion expression results in beneficial emotional responding. As a result if individuals with higher levels of BPF do demonstrate more implicit valuing of emotion expression over emotion control as hypothesised, this may be a contributing factor to emotion regulation problems in this population.

Appraisals theorists have suggested that the respective value of implicitly represented goals regarding intrinsic pleasure versus goal attainment can shape the generation of emotion and subsequent emotional behaviour (Scherer, 2013). In line

with this, research has explored how implicit hedonic versus utilitarian goals may influence emotion regulation preferences (Tamir et al., 2007). This was done using a gender balanced sample of 50 students who completed a lexical decision task designed to assess implicit perceived utility of approach (excited, elated) and avoidance emotions (nervous, worry), in the context of approach or avoidance goals. Participants were then asked to indicate their preferred activity prior to completing a threatening task. Activities were designed to induce fear, sadness, worry or calm and thus the selection of activities represents a situation selection emotion regulation strategy according to the process model of emotion regulation (Gross, 1998a). Findings showed that individuals demonstrated both explicit and implicit beliefs about the utility of emotions regardless of associated pleasure e.g. if the goal was to avoid failure, worry was judged as a useful emotion despite it being unpleasant. It was also found that implicit but not explicit representations of emotion utility influenced explicit emotion regulation actions (Tamir et al., 2007). More specifically, individuals that demonstrated implicit perceived utility for the emotion worry in the context of avoidance goals were significantly more likely to select a worry inducing activity prior to the threatening task. None of the other implicit utility scores were found to predict emotion regulation behaviour (Tamir et al., 2007). However, this research did not explore emotion inducing preferences when faced with an approach orientated task e.g. to obtain success. Therefore it is unclear how perceived implicit utility may impact on positive emotion regulation.

The findings presented by Tamir et al (2007) may be theoretically important in understanding unhelpful emotion regulation behaviours associated with BPF. This is because Biosocial theory suggests that invalidating environments during childhood respond to displays of negative emotions with hostility or disregard, teaching the individual that the experience of negative emotions, such as worry or nervousness, is wrong or at least socially unacceptable (Linehan, 1993). Theoretically this means that

with repeated exposure to these environments over time the child may develop an implicit representation of negative emotion as being unhelpful. As a result it would be expected that individuals with high levels of BPF would demonstrate low perceived utility for these negative emotions, regardless of the goal context. This may be important for understanding emotion regulation behaviours in this population, because it has been found that implicit perceived utility of an emotion may impact on how an individual chooses to regulate their emotions (Tamir et al., 2007).

The present study assessed implicit valuing of emotion regulation and emotion utility using two computer based implicit task taken from the implicit emotion regulation literature; Emotion Regulation Implicit Association Task (ER-IAT; Mauss et al., 2006) and the Lexical Decision Task created by Tamir et al. (2007). At the time of writing and to the best of the author's knowledge, the current study is the first to explore BPF in relation to implicit valuing of emotion expression and implicit perceived utility of emotions. Hypotheses are therefore based on the theoretical rather than empirical literature surrounding BPF. It was hypothesised that individuals demonstrating higher levels of BPF would demonstrate increased implicit valuing of both emotion expression and emotional control. It was also hypothesised that these individuals would demonstrate low implicit perceived utility for avoidance emotions regardless of goal context.

### **7.3. Method**

#### **7.3.1. Participants**

Participants were recruited from a university student population as part of the larger study 2 using a targeted recruitment approach outlined in Chapter 3. Ninety participants (N=71 Female, N=19 male), returned and successfully completed this study with a mean age of 22.33 years (SD=5.74). Using the classification procedures outlines in study 1, 24.4% of the participants included in study 2c scored above the threshold for



high levels of BPF on both measures, 24.4% on one measure only and 51.1% scored below the threshold on both measures of BPF. Information regarding the range, mean and standard deviation of BPF scores in this sample is presented in Table 7.2.

One female participant's data for the Lexical Decision Task was lost due to a file corruption. This resulted in a sample of n=90 for analyses involving the ER-IAT and n=89 for the Lexical decision task.

### **7.3.2. Materials**

The rationale for selection and psychometric properties of the measures included in this study has been discussed at length in chapter 3. As a result in this section only descriptive information is included to facilitate understanding of the analysis. The reader may refer back to chapter 3 for further details.

#### *Personality Assessment Inventory – Borderline Scales (PAI-BOR; Morey, 1991)*

The 24-item PAI-BOR scale was taken from the larger 344 item personality assessment inventory; designed to assess personality pathology according to DSM-IV diagnostic criteria (Morey, 1991). The PAI-BOR scale was used to provide a global score of BPF.

#### *Personality Diagnostic Questionnaire-4 (PDQ-4; Hyler, 1994)*

The PDQ-4 (Hyler, 1994) is a 99-item self-report screening measure based on criteria for personality disorder according to the DSM-IV (APA, 2000). From the larger PDQ-4 only scales to assess cluster B personality features were used: borderline scale (PDQ-BS), anti-social scale (AS), histrionic scale (HIS) and narcissistic scale (NAR). Each scale was used to assess the presence of the associated personality features.

#### *Center for Epidemiology Studies-Depression Scale (CES-D; Radloff, 1977)*

The CES-D is a short 20-item self-report questionnaire designed to measure depression symptoms in the general population. This questionnaire was used to assess levels of depression in the sample.

*Generalised Anxiety Disorder 7-item scale (GAD-7; Spitzer et al., 2006).*

The GAD-7 is a seven item screening measure for anxiety disorder which has been used to assess levels of anxiety in the general population. This questionnaire was used to assess levels of anxiety in the study sample.

*Emotion Regulation-Implicit Association Task (ER-IAT; Mauss et al., 2006)*

The ER-IAT was developed to assess implicit evaluations of emotion regulation; that is, the extent to which individuals value emotional control relative to emotional expression. In order to achieve this, the task was made up of 5 blocks. In each block participants were required to categorise words displayed on the screen using the ‘F’ and ‘J’ keys on the keyboard. The task for each block is displayed in Table 3.2. Blocks 1, 2 and 4 were for practice purposes only and were not included in analyses. Block 3 (associating positive words with emotional expression and negative words with emotional control) and Block 5 (associating negative words with emotional expression and positive words with emotional control) were the critical blocks consisting of 60 trials each. Response times for each trial were recorded with faster response times being indicative of a stronger association. In order to obtain an overall ER-IAT score Block 3 scores were subtracted from Block 5 scores, thus, higher ER-IAT scores represent more positive implicit valuing of emotion control relative to emotion expression.

*Emotion Utility Lexical Decision Task (Tamir, Chiu and Gross, 2007)*

The Emotion Utility Lexical Decision Task was developed to assess implicit evaluations about the utility of emotions in the attainment of goals. This task adopts a double prime design. In each trial participants are exposed to a goal prime for 4s. This was either an approach goal, such as ‘My goal is to succeed’, or an avoidance goal, such as ‘My goal is to avoid failure’. They are then immediately exposed to an emotion prime for 1s. This was either an approach emotion (‘Excited’ or ‘Elated’), or an

avoidance emotion ('Worried' or 'Nervous'). Approach emotions are emotions that promote the pursuit of reward (Carver, 2001). In this study the approach emotions 'excited' and 'elated' were used. Avoidance emotions are emotions that promote the avoidance of threat, in this study the emotions 'worry' and 'nervous' were used (Carver, 2001). Finally, the participant is exposed to a target word; this was a high utility word e.g. 'useful', a low utility word e.g. 'pointless' or a non-word e.g. 'pipul'. The participant's task is to identify whether the target word is a real word or a non-word and their response time is recorded.

All incorrect responses and responses to non-word trials were removed from the dataset. This led to eight possible trial combinations (Table 7.1). Means were computed for each participant for each of the 8 trial combinations. Response times were converted into z-scores, no absolute z-scores were found to be above 3 and therefore all data was retained for analysis. In order to obtain an implicit utility score for each participant, the high utility mean response times were subtracted from Low utility response times for the 4 Goal x Emotion Prime pairs. This resulted in 4 utility scores where higher scores represent higher implicit perceived utility, one for each of the goal x emotion pairs: Approach-Approach, Approach-Avoid, Avoid-Approach, Avoid-Avoid.

Table 7.1. Goal Prime x Emotion Prime x Target Type for Each of the Eight Trial Types in the Emotion Utility Lexical Decision Task.

Trial	Prime Pair	Goal Prime Type	Emotion Prime Type	Target Type
1	1	Approach	Approach	High Utility
2	1	Approach	Approach	Low Utility
3	2	Approach	Avoid	High Utility
4	2	Approach	Avoid	Low Utility
5	3	Avoid	Approach	High Utility
6	3	Avoid	Approach	Low Utility
7	4	Avoid	Avoid	High Utility
8	4	Avoid	Avoid	Low Utility

### 7.3.3. Procedure

After participating in study 2a and study 2b participants returned to complete two computer-based implicit tests: ER-IAT and the Lexical Decision Task. Therefore all participants had already completed all personality measures (PAI-BOR; *Morey, 1991* and PDQ; *Hyer, 1994*) when arriving to take part in the study. On arrival participants were reminded that their participation was voluntary and that they may choose to withdraw at any point within two weeks of the final participation session. Participants were seated in front of a computer and asked to complete the first computer based task. After completing the first computer based task participants were required to complete the mood questionnaire, including the GAD-7 and CES-D. Participants were then asked to complete the second computer based task. Standardised instructions for both tasks were presented on screen and each participant was given the opportunity to ask questions before the researcher left the room, allowing the participant to complete the task alone. This was to avoid any distractions that may impact on response time. The order in which the two computer-based tasks (ER-IAT and Lexical Decision task) were completed was counterbalanced to prevent order and fatigue effects. Each task lasted

approximately 10 minutes. On completion participants were thanked, fully debriefed and provided with an opportunity to ask questions.

## 7.4. Results

### 7.4.1. Descriptive Statistics

Table 7.2 presents the Range, Mean and standard deviations for all questionnaires. The PAI-BOR mean is higher than has been reported in previous student samples (M=26.71; Gardner & Qualter, 2009; M=27.23; Trull, 1995), whilst the PDQ-BOR was comparable (M=3.26; Gardner & Qualter, 2009). Regarding mood scores above 16 on the CES-D (Radloff, 1977) depression measure and above 15 on the GAD (Spitzer et al, 2006) are considered be high and indicate increased risk of mood disorder. Therefore it appears that there are high levels of mood disturbance within the current sample.

Table 7.2. Range, Mean and Standard Deviations for All Variables Assessed in Study2c

	Range	Mean (S.D)
Age	18 to 43	22.26 (5.76)
BPF	5 to 39.5	20.62 (8.05)
PAI_BOR	10 to 37	34.64 (12.29)
PDQ_BOR	0 to 9	3.30 (2.33)
Antisocial Personality	0 to 6	1.36 (1.36)
Histrionic Personality	0 to 8	2.87 (1.92)
Narcissistic Personality	0 to 6	2.09 (1.56)
GAD	7 to 28	15.33 (5.39)
CES	3 to 50	20.49 (11.34)

### 7.4.2. Implicit Valuing of Emotion Regulation and BPF

Accuracy and reaction time data was recorded for all five blocks included in the ER-IAT, three of which were for practice purposes only. Block 3 (associating positive

words with emotional expression and negative words with emotional control) and Block 5 (associating negative words with emotional expression and positive words with emotional control) were the critical trials. Overall Accuracy rates for Block 3 and Block 5 were acceptable (73%,  $SD=.44$  and 63%,  $SD= .48$  respectively). Reaction times for incorrect responses were removed from the dataset. To account for within participant variance the mean reaction time was divided by the standard deviation for each participant. Consistent with study 2a and 2b the presence of any potential outliers was explored by converting reaction time scores into z-scores with absolute z-scores above 3 being taken to indicate significant outliers. No absolute z-score was above 3 for Block 3 or Block 5. Final ER-IAT scores were calculated by subtracting the block 3 scores from block 5 scores. Thus higher ER-IAT scores represent more positive implicit evaluation of emotion regulation relative to emotion expression.

Consistent with studies 2a and 2b, hierarchical multiple regression (HMR) was used to explore the predictive relationship between BPF and implicit evaluations of emotion regulation whilst controlling for demographics and known BPF co-morbidity factors. As such, Model 1 includes demographic variables (Age and gender), Model 2 adds mood disturbance scores (Depression and Anxiety scores), Model 3 adds cluster B personality scores and the final Model, Model 4 adds BPF scores. In line with earlier discussions regarding mood and personality controls being too stringent, models for each DV were re-run twice, once excluding mood disturbance and once excluding cluster B personality scores.

Overall model fit was assessed using the overall  $F$  value. The change in model fit at each step of the analysis was determined via the  $R^2$  Change statistics. Therefore the  $R^2$  change for the final model will indicate the amount of variance that is uniquely predicted by BPF. The contribution of individual variables within significant model

steps was assessed using standardised Beta values ( $\beta$ ). Results from the HMR are displayed in Table 7.2. None of the models indicated a significant overall model fit or  $R^2$  Change. Therefore none of the steps significantly predicted ER-IAT. Further this finding remained following the exclusion of mood disturbance and cluster B personality disorder scores from the model.

Table 7.3. Hierarchical Multiple Regression Analysis Results for ER-IAT

	B	SE	<i>B</i>	<i>F</i>	<i>R<sup>2</sup>Change</i>
<b>Model 1</b>				.141	.00
Age	-.01	.01	-.05		
Gender	-.06	.19	-.04		
<b>Model 2</b>				.63	.03
Age	-.01	.01	-.07		
Gender	-.06	.19	-.04		
Depression	-.02	.01	-.25		
Anxiety	.03	.02	.18		
<b>Model 3</b>				.82	.04
Age	-.01	.01	-.05		
Gender	-.12	.20	-.07		
Depression	-.02	.01	-.28		
Anxiety	.03	.02	.20		
Antisocial	.05	.07	.10		
Histrionic	-.07	.05	-.19		
Narcissistic	.07	.06	.14		
<b>Model 4</b>				.72	.00
Age	-.01	.01	-.05		
Gender	-.12	.20	-.07		
Depression	-.02	.01	-.27		
Anxiety	.03	.02	.21		
Antisocial	.06	.08	.11		
Histrionic	-.07	.05	-.18		
Narcissistic	.07	.07	.15		
BPF	-.00	.01	-.05		



### **7.4.3. Implicit utility of Emotions and BPF**

Implicit utility scores for each of the four goal prime pairs were included as the dependent variable in separate HMR analyses. Results from the HMR for implicit utility of emotion are displayed in Table 7.3. Overall model fit was assessed using the overall *F* value. The change in model fit at each step of the analysis was determined via the *R*<sup>2</sup> Change statistics. The contribution of individual variables in significant model steps was assessed using standardised Beta values ( $\beta$ ).

Results show that in the approach x approach condition none of the models were found to demonstrate a significant fit for the data. In the approach x avoid condition, Model 2 was the only model found to demonstrate a significant model fit. Standardised Beta values indicate that this is driven by a significant negative predictive relationship between depression scores and approach x avoid utility scores. This suggests that individuals with high levels of depression are less likely to value approach emotions in the presence of avoidance goals. In the avoid x approach condition none of the models demonstrated a significant overall fit for the data. In the avoid x avoid condition, Model 4 was found to demonstrate a significant overall model fit and *R*<sup>2</sup> Change explaining an additional 5% unique variance of implicit emotional utility for the avoid x avoid condition. Standardised Beta values indicate that this is driven by two individual significant predictors: Depression scores and BPF scores. Depression scores demonstrate a significant positive predictive relationship with avoid x avoid Utility scores. This suggests that individuals with higher levels of depression implicitly value avoidance emotions (e.g. Worry) in the presence of avoidance goals. BPF scores demonstrate a significant negative predictive relationship with avoid x avoid utility scores. This indicates that individuals with higher levels of BPF implicitly believe that avoidance emotions are unhelpful in the pursuit of avoidance goals.

Table 7.4. Hierarchical Multiple Regression of Implicit Utility of Emotions for All Four Goal x Emotion Prime Pairs

	Approach Goal x Approach Emotion					Approach Goal x Avoid Emotion					Avoid Goal x Approach Emotion					Avoid Goal x Avoid Emotion				
	Beta	SE	$\beta$	$F$	$R^2$	Beta	SE	$B$	$F$	$R^2$	Beta	SE	$\beta$	$F$	$R^2$	Beta	SE	$\beta$	$F$	$R^2$
<b>Model 1</b>				1.25	.03				.26	.01				1.48	.034				.65	.02
Age	-11.44	7.92	-.16			6.41	10.48	.07			11.59	14.55	.085			10.11	13.13	.08		
Gender	-71.44	110.61	-.07			56.69	146.25	.04			-308.65	203.10	-.163			-153.60	183.24	-.09		
<b>Model 2</b>				.88	.01				2.21	.09*				2.11	.059				.97	.03
Age	-12.47	8.06	-.17			2.113	10.22	.02			14.47	14.43	.107			12.95	13.23	.11		
Gender	-88.11	114.43	-.09			35.29	145.11	.03			-398.06	204.87	-.210			-182.49	187.89	-.11		
Dep	-5.05	6.29	-.14			-22.31	7.981	-.46**			16.01	11.27	.232			15.20	10.33	.25		
Anx	2.54	13.59	.03			28.51	17.23	.27			-55.28	24.332	-.374*			-33.87	22.32	-.26		
<b>Model 3</b>				1.24	.06				1.41	.01				1.84	.05				1.44	.07
Age	-10.41	8.01	-.14			1.20	10.41	.02			13.78	14.42	.10			13.39	13.08	.11		
Gender	-66.65	118.48	-.07			58.39	153.86	.04			-395.40	213.13	-.21			-195.57	193.44	-.12		
Dep	-4.45	6.45	-.12			-20.86	8.37	-.43*			18.36	11.59	.27			16.99	10.52	.28		

Anx	1.93	13.59	.02		29.91	17.65	.29		-47.65	24.45	-.32		-25.59	22.19	-.19	
AS	-31.70	40.54	-.10		-23.04	52.64	-.06		-6.55	72.92	-.011		5.77	66.18	.01	
HIS	-30.02	28.82	-.14		9.06	37.43	.03		-62.80	51.84	-.15		-95.07	47.05	-.26*	
NAR	84.014	37.29	.30*		-37.16	48.43	-.10		52.64	67.08	-.10		-13.61	60.88	-.03	
<b>Model 4</b>				1.11	.00			1.25	.00			1.61	.14		1.85	.05*
Age	-9.85	8.13	-.13		.442	10.56	.01		14.61	14.63	.11		17.07	12.94	.14	
Gender	-67.74	119.08	-.07		59.89	154.60	.05		-397.02	214.30	-.21		-202.85	189.56	-.12	
Dep	-3.47	6.77	-.09		-22.21	8.79	-.45*		19.82	12.19	.29		23.53	10.78	.38*	
Anx	3.78	14.16	.05		27.37	18.38	.26		-44.90	25.48	-.30		-13.25	22.54	-.10	
AS	-21.59	45.57	-.07		-36.94	59.16	-.09		8.44	82.01	.02		73.12	72.54	.14	
HIS	-26.14	30.00	-.12		3.74	38.95	.01		-57.05	53.99	-.14		-69.24	47.76	-.19	
NAR	88.33	38.47	.32*		-43.09	49.95	-.12		-46.24	69.24	-.09		15.15	61.25	.03	
BPF	-2.97	6.00	-.10		4.08	7.79	.10		-4.41	10.80	-.08		-19.79	9.55	-.39*	

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*Note:* Dep=Depression, Anx=Anxiety, AS=Antisocial personality features, HIS=Histrionic personality features, NAR=Narcissistic personality features, BPF=Borderline Personality features, \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

## **7.5. Summary of Main Findings**

Findings from this study showed that there was no relationship between BPF and implicit valuing of emotion regulation. This suggests that individuals with higher levels of BPF do not demonstrate implicit valuing of expression, as hypothesised. However, BPF was found to demonstrate a significant negative predictive relationship between BPF and implicit perceived utility of avoidance emotions in the context of avoidance goals. This suggests that individuals with higher levels of BPF tended to implicitly perceive avoidance emotions, such as nervousness and worry, as more unhelpful but only when trying to avoid harm. In contrast it was found that depression scores demonstrate a significant positive predictive relationship with implicit utility of avoidance emotions in the context of avoidance goals and a negative predictive relationship in the context of approach goals. This suggests that individuals with high levels of depression tend to implicitly perceive avoidance emotions, such as nervousness and worry, as helpful when trying to avoid harm but unhelpful when trying to attain success.

## **7.6. Discussion**

The aim of this study was to explore implicit values regarding emotion regulation and emotion utility in relation to BPF. No significant predictive relationship was found between BPF and implicit valuing of emotion control or emotion expression. However, higher BPF scores were found to predict lower implicit perceived utility of avoidance emotions, such as worry and nervousness. Yet this was only found in the presence of avoidance goals. This suggests that individuals with high levels of BPF do not value the presence of avoidance emotions, such as worry and nervousness, when trying to avoid harm or threat. In contrast it was found that higher depression scores predicted higher utility of avoidance emotions in the presence of avoidance goals and lower utility in the presence of approach goals. This suggests individuals with high

levels of depression are more likely to value worry and nerves when trying to avoid threat/harm but not when trying to obtain success. Each of these findings is now discussed in further detail with reference to past theory and research.

#### **7.6.1. Implicit Valuing of Emotion Regulation**

The finding that BPF was not associated with the overall ER-IAT score may be explained using Linehan's biosocial theory of BPF (Linehan, 1993). According to biosocial theory an invalidating environment is one in which outward displays of negative emotion experiences are disregarded or treated with hostility. However, support for negative emotional experiences may still be provided following extreme emotional outbursts. Based on this, it was originally hypothesised that individuals with high levels of BPF would demonstrate implicit valuing for emotion expression over emotion control. This was not supported by the data. However, further contemplation of biosocial theory led to the consideration that emotion control may also be valued in this population. This is because biosocial theory suggests that individuals may also attempt to change their behaviour so that it meets the expectations of the invalidating environment (Linehan, 1993). Therefore the individuals may attribute value to both emotional control and extreme emotional expression as both may lead to desirable outcomes within the invalidating environment. As a result the analyses of ER-IAT scores; where high scores represent valuing of emotion control and low score indicate valuing of emotion expression, may have been inappropriate. This is because for those individuals that value both emotion control and emotion expression the effects would cancel each other out. This may explain why no relationship was found between BPF and ER-IAT scores.

However, the current study only assessed *implicit* evaluations and therefore it may be that individuals with high levels of BPF do differ in their valuing of emotion expression and control but that this is not implicitly represented. It is theorised that in

order for a goal to become implicitly represented, it must be pursued with the same behaviours consistently over-time (Aarts & Dijksterhuis, 2000). Biosocial theory (Linehan, 1993) suggests that these individuals may oscillate between emotional control and extreme emotion expression in an attempt to manage internal emotional states. As a result these patterns of emotion regulatory behaviour are unlikely to have been consistently replicated overtime and as a result may not have become implicitly represented. Instead these emotion regulatory behaviours may still lie solely within the domain of explicit emotion regulation, demanding deliberate conscious consideration and using valuable cognitive resources. It has previously been found that cognitively intense emotion regulation strategies are less effective during times of intense emotional states (Sheppes & Meiran, 2008). Therefore it may be that emotion regulation is difficult for individuals with high levels of BPF during high emotion intensity, as they rely more on explicit emotion regulation, which is cognitively demanding.

Alternatively, the lack of a significant relationship between BPF and implicit valuing of emotion control may have resulted from order effects. Although Block 4 was included as a practice block designed to reverse the instructions from previous blocks, reaction times for Block 5 were significantly larger than for Block 3. This, together with anecdotal evidence from participants, may be an indication that Block 5 was more difficult due to interference of the instructions from earlier blocks. To clarify this issue, this study requires replication using a counter-balanced design.

#### **7.6.2. Implicit Utility of Emotion**

Findings regarding the implicit utility of emotions suggested that individuals with high levels of BPF view avoidance emotions as unhelpful when trying to avoid threat or harm. This finding is consistent with biosocial theory, which postulates that as a result of constant emotion invalidation in childhood, individuals with high levels of BPF have learnt that the experience and expression of negative emotions is

inappropriate, socially unacceptable and not to be trusted (Linehan, 1993). However, this is inconsistent with the theoretical underpinning of avoidance emotions, which suggests that avoidance emotions promote harm avoidance behaviours (Carver, 2001). In addition this finding is in contrast with previous empirical findings in normative samples where avoidance emotions are perceived to have high utility when trying to avoid harm (Tamir et al., 2007). As a result this may be an indication that individuals with high levels of BPF have deficient knowledge of the utility of emotions in obtaining goals; particularly when the goal is to avoid harm. This interpretation is consistent with past research demonstrating that higher levels of BPF are associated with poorer abilities to understand and use their emotions (Gardner & Qualter, 2009a). In addition, Tamir et al (2007) found that implicit perceptions of emotion utility are associated with congruent emotion regulation behaviours (Tamir et al., 2007). Therefore it may be the case that these individuals are attempting to regulate their emotions in a way that is counterproductive to the situational goals; decreasing emotions that may be beneficial to the situational goal of harm avoidance. In turn the failure to meet situational goals may lead to further negative emotion (Scherer, 2013). Consequently this may become an unhelpful sequence of emotion regulation and may explain the presence of intense negative emotions experienced by individuals with high levels of BPF.

Alternatively, these individuals may have sufficient knowledge of the utility of the emotion (Beblo et al., 2010), but still consider the emotion unhelpful due to a focus on hedonic rather than utilitarian goals. It has been suggested that this pattern of implicit beliefs regarding emotion utility demonstrates a preference for short-term pleasure over long-term benefits (Tamir, 2009). This is because avoidance emotions such as nervousness and worry are considered to be helpful when trying to avoid harm (Carver, 2001; Tamir et al., 2007). However, feeling worried or nervous may also be considered unpleasant, creating a conflict of goals harm avoidance or immediate pleasure. The

finding that individuals view avoidance emotions as unhelpful in avoiding harm may be taken as an indication their primary goal is short-term pleasure rather than long-term benefits. This is consistent with findings that individuals with high levels of BPF are less willing to experience distress in the pursuit of long-term emotion regulatory goals (Gratz et al., 2006). However, if the findings of this study were driven by hedonic rather than emotion regulatory goals, it would be expected that they would perceive avoidance emotions as unhelpful regardless of the goal context. This was not the case as BPF only predicted avoidance emotions as unhelpful in the presence of avoidance goals and not in the presence of approach goals. Therefore on balance it appears more likely that these individuals demonstrate insufficient knowledge of the utility of emotions in goal pursuit and may benefit from interventions to improve knowledge of emotion utility.

In contrast to BPF, depression scores were found to predict higher implicit utility of avoidance emotions in the presence of avoidance goals but lower implicit perceived utility of avoidance emotions in the presence of approach goals. This is consistent with the theoretical literature on avoidance emotions, which suggests that they promote harm avoidance behaviours, and findings using normative samples (Tamir et al., 2007). This finding suggests that individuals with high levels of depression may be motivated to regulate emotions for utilitarian rather than hedonic reasons (Tamir, 2009); to obtain long-term goals rather than gain immediate pleasure. Further, this pattern of implicit beliefs has been found to predict early emotion regulatory behaviours. For example, individuals that value worry in the avoidance of harm are more likely to choose worry inducing situation prior to embarking on an avoidance goal (Tamir et al., 2007). Although, this study investigated non-clinical levels of BPF and depression the contrast between these two relationships may have important theoretical implications for distinguishing between BPD and mood disorders, an area of debate



within the literature. It appears BPD may be characterised by low perceived utility for negative avoidance emotions whilst Depression may be characterised by high perceived utility for these emotions.

Another possible explanation for the findings regarding implicit perceived utility is that individuals with high levels of BPF view avoidance emotions as unhelpful due to their overwhelming intensity. It is well documented within the theoretical and empirical literature that individuals with higher levels of BPF experience higher emotion intensity (e.g. Ebner-Priemer et al., 2007; Linehan, 1993; Selby & Joiner, 2013). In addition individuals with BPD, and therefore extreme levels of BPF, have been found to demonstrate higher emotion intensity than individuals with axis I mood disorders such as Bipolar Disorder (Henry et al., 2001). This may explain the conflict in findings between BPF and Depression; because individuals high on BPF may experience the emotions as more intense and therefore overwhelming and unhelpful. However past literature suggests that these individuals experience negative emotions in general as more intense, not just avoidance emotions. For example they have been found to experience more intense anger (Jacob et al., 2008), which is considered to be an approach emotion (Carver & Harmon-Jones, 2009). In the current study all approach emotions could be considered positive, such as excited or elated, and all avoidance emotions could be considered negative, such as worry or nervousness. Therefore findings may have been driven by the negativity of these emotions rather than their avoidance nature. This may also explain why these emotions are implicitly perceived as more unhelpful when facing avoidance goals but not approach goals; because it is reasonable to suspect that negative emotion intensity is likely to be higher when avoiding threat than when pursuing success. This is also supported by research demonstrating that individuals with high levels of BPF only demonstrate increased emotion reactivity when focusing on threatening stimuli (Baskin-Sommers et al., 2012).

The finding that individuals with high levels of BPF demonstrate lower implicit perceived utility for negative avoidance emotions may have important implications for understanding emotional experiences within this population. More specifically, the perception of avoidance emotions as unhelpful may inadvertently lead to an increase in negative emotion, thus offering an explanation for the high negative emotion intensity in this population. According to appraisals theories (e.g. Lazarus, 1991; Scherer, 2013), the appraisal of a situation as harmful to the attainment of a goal activates negative emotional responses. Therefore, the appraisal of negative emotional responses as unhelpful may, in turn, trigger the development of further negative emotion, resulting in negative emotion cascades similar to those outlined in the emotional cascades model of BPF (Selby & Joiner, 2009). Consequently, implicit perceptions of negative emotions as unhelpful may contribute to the rapid escalation of negative emotional intensity associated with BPF.

### **7.6.3. Limitations and Future Research**

The findings of this study must be considered in the context of its limitations. Consistent with study 2a/2b of this thesis, and past literature in this area, the sample used for this study was predominantly female. This prevents findings from being extended to male populations. However, here the focus will be on limitations relating to directly to study 2c, as more global limitations will be fully explored in the general discussion.

Firstly, a major limitation of the ER-IAT protocol implemented in this study and in the original study by Mauss et al. (2006) is that the order of the critical experimental blocks was not counter-balanced. Instead a practice block was included in Block 4, which reversed the target key allocations from Block 3 ready for the completion of Block 5 (see Table 5.3). However it may have been that participants experienced more difficulty in Block 5, where the instructions were reversed. As a result it is possible that

some order effects may be present. This is supported by the finding that overall response times for Block 5 were significantly longer than for Block 3, and by anecdotal evidence with participants generally describing the last block, Block five, as being the most difficult. These order effects may have masked significant predictive relationships that may have otherwise been present. As a result these findings need to be replicated in future research using a fully counter-balanced design.

Secondly, the interpretation of the findings from this study is complicated due to limitations of the approach and avoidance emotion primes used. All approach emotion primes were positive (e.g. excited) and all avoidance emotion primes were negative (e.g. worry). However it is possible for some negative emotions to be motivationally considered approach emotions, such as anger (Carver & Harmon-Jones, 2009). As a result it cannot be concluded whether findings are to be attributed to the approach-avoid nature of the emotions or the pleasantness of the emotion more generally. For example, it may be that individuals with high levels of BPF find all negative emotions unhelpful in the pursuit of avoidance goals, not just avoidance emotions. Future research using both positive and negative approach and avoidance emotion primes is needed to clarify this.

Thirdly, the double prime design adopted for the lexical decision task resulted in a longer stimulus onset asynchrony (SOA) of 5s. As a result it is possible that the semantic priming effect is likely to have been driven by expectancy based priming (Becker, 1980) rather than automatic spreading activation (Collins & Loftus, 1975; Neely, 1991). The expectancy based priming effect requires a conscious relation being made between prime and target. Thus the extent to which any effects found are truly implicit is uncertain. In order to establish the true implicit nature of findings further research is required using shorter SOAs.

Finally, the current study did not explicitly measure emotion regulation behaviours. Therefore the link between implicit utility and emotion regulation is only theoretically inferred, based on past research findings (e.g. Tamir et al., 2007). As a result it cannot be concluded that implicit beliefs regarding emotion utility mediate the relationship between BPF and unhelpful emotion regulation behaviours. However, this study has provided preliminary evidence that implicit perceptions of emotion utility may be disrupted in individuals with high levels with BPF highlighting the need for further research in this area.

#### **7.6.4. Conclusions and Implications**

The findings of this study show that individuals with high levels of BPF demonstrate differences in their implicit perceptions of emotion utility for negative emotions in threatening situations, as reported in section 7.4.2. This may have important consequences for the individual's emotional experiences and regulatory behaviours. Additionally, these perceptions appear contradictory to those held by individuals with high levels of depression and may play an important role characterising the emotional difficulties associated with BPF from those associated with other emotional disorders such as major depression. Furthermore, these findings may have important implications for future research and subsequent practice in supporting individuals with high levels of BPF.

The suggestion from current findings that emotion regulatory goals held by individuals with high levels of BPF may be explicitly but not implicitly represented may have important implications for the process of emotion regulation. This is because explicit emotion regulation, in contrast to implicit emotion regulation, requires conscious deliberation, implementation and monitoring and as a result is demanding on cognitively resources (Gyurak et al., 2011; Koole & Rothermund, 2011; Mauss, Bunge, et al., 2007). Given past research demonstrating that cognitively intense emotion

regulation processes become less successful in the presence of intense emotion (Sheppes & Meiran, 2008). It may be that for these individuals, who typically experience intense emotions, relying solely on cognitively demanding explicit emotion regulation processes contributes to emotion regulation difficulties. This highlights the need for future research to clarify the presence of emotion regulation goals as implicit or explicit constructs within this population.

According to appraisals theory, the perception of threat to goal attainment triggers a negative emotional response (e.g. Lazarus, 1991). Thus the presence of implicitly held beliefs that negative emotions are unhelpful when trying to avoid harm, may lead to the development of further negative emotions and explain the high levels of emotion intensity associated with high levels of BPF. If this link is established in further research, this may have important implications for helping individuals with high levels of BPF to develop better emotion regulation skills. More specifically, this would support the use of acceptance and mindfulness based techniques, which teach the individual to observe the negative emotions without making evaluations (Lynch, Chapman, et al., 2006). This may work to neutralise perceptions of the emotion as unhelpful and thus prevent the development of subsequent negative emotions.

However, past empirical literature has demonstrated that implicit beliefs can be particularly resistant to change (Gregg, Seibt, & Banaji, 2006) and can remain following the successful alteration of explicit beliefs (Huijding & de Jong, 2009). Nevertheless, the finding that this perception of emotion is implicitly represented indicates a new target for empirical research and treatment; alteration of implicit beliefs. In addition the finding that implicit beliefs are in an opposing direction to the theoretical functionality of avoidance emotions suggests that exploration and education regarding the functional

utility of emotions may be a welcome addition in helping to reshape implicit utility beliefs.

## **Chapter 8 : General Discussion**

### **8.1. Overview**

Emotion dysregulation is theorised to be a core factor in the development and maintenance of Borderline Personality Features (BPF) (Linehan, 1993). The research included in this thesis investigated the relationship between BPF and several aspects of emotion regulation including: the type of emotion regulation strategy, the intensity of the emotion to be regulated, the duration of emotion regulation attempts and implicit evaluations regarding emotions and emotion regulation. In this chapter, the key contributions of the research included in this thesis are discussed in relation to past theory and research. Following this, the strengths and limitations of the thesis are discussed, along with recommendations for future research directions and consideration of potential implications.

Biosocial theory states that BPF develop and are maintained by problems in emotion regulation (Linehan, 1993). The theory states that these problems occur as a result of emotional vulnerabilities, which increase demand for effective emotion regulation, paired with deficits in emotion regulation skills as a result of emotion invalidation during childhood (Linehan, 1993). However, the literature to date does not provide a clear picture of how individuals with high levels of BPF attempt to regulate their emotions in everyday situations or what aspects of these emotion regulation attempts are problematic. The overall aim of this thesis was to improve understanding of how individuals with high levels of BPF regulate their emotions and what characteristics within these attempts might be problematic.

## **8.2. Negative Emotion Regulation and BPF**

Taken together, the findings from study 1 and study 2a suggest that individuals with high levels of BPF demonstrate sufficient knowledge of emotion regulation strategies, comparable to those with low levels of BPF. Yet they are less likely to implement helpful strategies and more likely to implement unhelpful strategies when attempting to regulate negative emotions. These findings conflict with past research, which suggests that BPF are associated with poorer knowledge of emotion regulation strategies (Gardner & Qualter, 2009a). In addition research using the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) has found that BPF are associated with the subscale Limited Access to Emotion Regulation Strategies, concluding that these individuals demonstrate a limited knowledge of strategies (Glenn & Klonsky, 2009; Gratz & Roemer, 2004; Salsman & Linehan, 2012). However this scales contains items that ‘reflect the belief that little can be done to regulate emotions effectively’ (Gratz & Roemer, 2004, p47). It may be argued that this does not directly assess knowledge of emotion regulation strategies and instead may be interpreted as assessing emotion regulation self-efficacy beliefs. By comparison, the research included in this



thesis adopted a qualitative approach allowing individuals to describe how they regulate their emotions in their own words. It is argued that this technique provides a more direct measure of the individual's knowledge of emotion regulation strategies. However it is acknowledged that during the short interview participants may not disclose all strategies known and findings may under represent strategy knowledge. This further strengthens the argument based on findings from this thesis that individuals with high levels of BPF have sufficient knowledge of strategies.

Consistent with these findings, other research has reported individuals with extreme levels of BPF, sufficient for a BPD diagnosis, demonstrate knowledge of a range of emotion regulation strategies, equal to healthy controls (Beblo et al., 2010). Furthermore and consistent with the findings of this thesis, past research has reported the use of a range of unhelpful emotion regulation strategies in this population, such as suppression (Rosenthal et al., 2005), experiential avoidance (Iverson et al., 2012) and rumination (Baer & Sauer, 2011; Selby & Joiner, 2009, 2013). Together these studies support the conclusions that individuals with high levels of BPF have sufficient knowledge of a range of emotion regulation strategies but choose to use more unhelpful ones.

Exploratory analyses of association between BPF and the use of specific strategy types revealed that BPF was only specifically associated with the use of one unhelpful strategy: *Learned Helplessness*. However when not controlling for cluster B personality features or mood disturbance, BPF predicted increased use of all unhelpful strategies (*Rumination, Acting Out, Learned Helplessness, Substance Use*) and decreased use of all helpful strategies (*Reappraisal, Expression, Attention Re-orientation, Situation Modification*). The finding that many of these strategies were only associated with BPF after removing mood disturbance and cluster B personality variables as controls may be

taken as an indication that these variables are driving the finding. This raises an important theoretical consideration present throughout the thesis; should these variables be considered co-morbid factors or aspects of BPF?

Past research has demonstrated high levels of co-morbidity between BPF, other personality disorders and mood disorders (Blais & Norman, 1997; Grant et al., 2008). Therefore high levels of mood disturbance or other personality features may be considered signs of co-morbidity, which should be controlled for in order to establish the specificity of findings to BPF. However, ‘marked reactivity of mood’ is a diagnostic feature of BPD, suggesting that mood disturbance *is* a borderline personality feature. The inclusion of mood disturbance as part of BPF is further supported by the decision to include depressivity and anxiousness as diagnostic features of BPD in the alternative model of the recently published DSM 5 (American Psychiatric Association, 2013). In light of this, the controlling of mood disturbance and cluster B personality features is considered somewhat stringent and may be obscuring some important features of emotion regulation associated with BPF. As a result, for the remainder of this chapter all findings irrespective of their status of specificity are discussed, where findings are specific to BPF this will be noted accordingly.

Theoretically, the finding that individuals with high levels of BPF choose to implement more unhelpful strategies when regulating negative emotions comes as no surprise and is consistent with the theoretical conceptualisation of BPF/BPD as a disturbance of the emotion regulation system (Linehan, 1993). The finding that individuals with high levels of BPF report using a range of helpful and unhelpful strategies does not contradict this conceptualisation and Linehan’s theoretical model, as the finding can only be taken to indicate *knowledge* of available strategies, and does not confirm that helpful strategies are used consistently or appropriately. It does however

highlight an important point: individuals with BPF have sufficient understanding of how they can regulate their emotions, even if they choose not to utilise this knowledge; this could be capitalised on during treatment.

However, it is not clear from the findings of studies 1 and 2a of this thesis *why* individuals with high levels of BPF choose more unhelpful strategies for emotion regulation, despite having knowledge of more helpful alternatives. Findings from study 1 of this thesis suggest that diverting attention away from negative stimuli and towards positive stimuli may be more difficult for these individuals. As a result they may be forced to use more unhelpful strategies, such as rumination, which involve maintained attention on the negative stimuli. Alternatively, the emotion regulation literature highlights three factors that influence strategy choice; emotion intensity at the time of regulation, perceived cognitive demand and the presence of long versus short term emotion regulatory goals (Sheppes et al., 2012, 2011). Emotion intensity was found to be the more dominant of these factors; influencing strategy selection irrespective of cognitive demand or current goal (Sheppes et al., 2012). More specifically it was found that the higher the emotion intensity the more likely individuals are to select disengaging strategies, such as distraction, over engaging strategies such as reappraisal.

Findings from study 2b of this thesis demonstrate that individuals with higher levels of BPF attempt to regulate their negative emotions when emotional intensity is higher. This was found after controlling for negative emotion intensity more generally and demonstrates that the higher intensity is specific to the point of regulation and not the result of overall higher emotion intensity previously been found in this population (e.g Ebner-Priemer et al., 2007; Zeigler-Hill & Abraham, 2006). Taken together with findings from study 1 and 2a, this may explain why individuals with higher levels of BPF choose unhelpful strategies, avoidance based strategies, despite having knowledge

of more helpful alternatives: the high emotion intensity may encourage the selection of more disengaging strategies. This has important theoretical implications as disengaging strategies, such as distraction, are more effective than engaging strategies, such as reappraisal, at reducing negative emotion when intensity is high (Sheppes & Meiran, 2007). Therefore it may be argued that these individuals are making informed helpful decisions regarding emotion regulation: selecting strategies that are likely to be most effective in reducing negative affect during high emotional intensity. Although there is research to the contrary (Gardner & Qualter, 2009a), this is consistent with reports that individuals with a diagnosis of BPD, and therefore extreme levels of BPF, are able to select appropriate emotion regulation strategies to meet situational demands (Beblo et al., 2010).

It may be argued that the ‘unhelpful strategies’ assessed in the current study are not necessarily indicative of disengagement strategies. One of the strategies considered unhelpful, rumination, requires engaging with the emotional stimuli. Therefore it cannot be concluded from the current findings that the increased use of unhelpful strategies was driven by increased reporting of disengagement strategies. Nevertheless, association between BPF and the use of avoidance based emotion regulation strategies has been consistently reported in the empirical literature, such as self-harm, experiential avoidance or suppression (Brown et al., 2002; Iverson et al., 2012; Rosenthal et al., 2005).

As argued earlier, the use of avoidance based strategies may be beneficial for reducing unwanted negative emotions in the short term, particularly when emotions are intense, but there are also negative outcomes associated with the repeated use of these strategies over time. For example, consistent use of avoidant emotion regulation strategies has been found to predict increases in depression and anxiety (Krause et al., 2003). In addition, avoidance based strategies may have negative long term

implications as they prevent the processing of emotional information and emotional experiences (Richards & Gross, 2000). As a result the individual is unable to learn alternative ways to deal with the situation in the future, which is theorised to contribute to low emotion regulation self-efficacy. Therefore, it is important that, despite high emotion intensity, the individual uses a range of strategies including those that involve engaging with the emotional information, such as reappraisal.

Based on findings presented above it appears that emotion regulation difficulties experienced by individuals with high levels of BPF may result from high emotion intensity at the time of regulation. Consequently, it would be beneficial to understand why these individuals regulate their emotions when emotion intensity is higher. Appraisal theories (e.g. Scherer, 2013) and Gross's process model of emotion regulation (Gross, 1998a), suggest that emotion intensity builds gradually throughout the generation of an emotion, with emotional intensity reaching its peak when all appraisals have been made. Thus the finding that individuals with high levels of BPF regulate their negative emotions when intensity is high may indicate that regulation attempts are being made later in the generation process, when emotions are fully formed. This is consistent with biosocial theory, which proposes that individuals with higher levels of BPF experience difficulty in preventing the onset of unwanted emotions (Linehan, 1993). In addition, it has been reported that these individuals demonstrate poor awareness of their own emotions (Levine et al., 1997). This suggests that they may not be aware of the emotion as it builds and therefore only make attempts to regulate when the emotion is intense enough to demand attention and enters consciousness. This highlights a potential target for treatment: *early* identification and regulation of negative emotion. However, biosocial theory (Linehan, 1993) suggests that intense emotional responses are biologically determined, rapid and resistant to change. An alternative

approach would be to ensure that these individuals are equipped with skills to effectively regulate emotions when intensity levels are high.

Past research has shown that a range of strategies, including engagement strategies such as reappraisal, can be effective when emotion intensity is high if used over an extended period of time (Sheppes & Meiran, 2007). This indicates that negative emotion regulation during high emotional intensity necessitates longer periods of regulation. Research in this thesis found that individuals with high levels of BPF attempt to regulate emotion when intensity is high. As a result, these individuals would need to engage in longer periods of emotion regulation in order to use helpful engagement strategies effectively.

Findings from study 2b showed that BPF did not predict the duration of negative emotion regulation attempts. This means that despite higher emotion intensities, individuals with high levels of BPF do not appear to engage in longer periods of emotion regulation. There is little theoretical or empirical literature surrounding the duration of emotion regulation in this field. However, two possible explanations have been identified based on the available literature. Firstly, if individuals are using disengagement strategies, rather than engagement strategies, then a longer duration of emotion regulation may not be required in order to obtain success. This is because research suggests that the disengaging strategy distraction, is effective as soon as it is applied (Sheppes & Meiran, 2007). Secondly, these individuals may attempt to use engagement strategies, such as reappraisal, but may find engaging with emotional information too distressing, resulting in the attempt being terminated early. The latter explanation is consistent with past research demonstrating low levels of distress tolerance by individuals with high levels of BPF (Gratz et al., 2006). Alternatively, it may be a combination of these explanations; individuals may attempt to use reappraisal but find this too distressing and thus switch to distraction, which has a more immediate

effect. It is beyond the findings of this thesis to speculate which, if any, of these explanations are correct. Further research exploring the patterns of multiple strategy use within a single emotion regulation episode may be beneficial to address this issue.

Findings from study 2c showed that the presence of BPF was not associated with implicit valuing of emotion expression or emotion control. Linehan's biosocial theory (1993) suggests that the emotionally invalidating environment during childhood responds to negative emotion display with disregard or hostility. However when an extreme emotional display is made, support is likely to be provided. It is concluded that, consistent with biosocial theory, this may lead to valuing of both emotion control and emotion expression. Thus exploring these concepts in relation to each other may have led to non-significant findings.

It may be possible that, consistent with biosocial theory, individuals with high levels of BPF demonstrate more extreme valuing of emotion expression and emotion control but that these values are not implicitly represented. In order for goal-behaviour links to become implicit representations, it is theorised that they must occur consistently over time (Aarts & Dijksterhuis, 2000). Biosocial theory suggests that instead these individuals may oscillate between using emotion control to meet the expectations of the invalidating environment, followed by extreme emotional behaviour if this attempt fails (Linehan, 1993). As a result these behaviours may not have been consistently used and thus may not be implicitly represented and these individuals may rely on cognitively demanding explicit emotion regulation processes.

It is suggested that emotion regulation occurs almost constantly throughout the day in order to ensure that emotions do not distract from an individual's goals and that outward displays of emotion are socially acceptable (Gyurak et al., 2011). Therefore the use of explicit processes for all emotion regulation requirements, which require conscious deliberate initiation and monitoring throughout, is likely to be cognitively

intense. Past research has shown that some cognitively intense strategies become less effective when the emotion to be regulated is intense (Sheppes et al., 2009; Sheppes & Meiran, 2008), which tends to be the case for individuals with high levels of BPF, according to the findings in this thesis. Therefore a reliance on explicit emotion regulation may explain emotion regulation difficulties in this population. In addition it may explain why these individuals do not use cognitively demanding strategies such as reappraisal or savouring, as indicated by findings in study 2a; because cognitive resources are in high demand.

Alternatively this finding may have resulted from methodological flaws in the study protocol. More specifically, the order of the critical blocks included in the ER-IAT was not counterbalanced. As a result it is plausible that participants may have found Block 5 (where shorter reaction times represent positive valuing of emotion control) more difficult. This may have led to larger reaction times that were unrepresentative of the true association. As a result this finding requires further replication prior to any firm conclusion being drawn.

Findings regarding the implicit perceived utility of emotions revealed that individuals with higher levels of BPF demonstrate lower implicit perceived utility for avoidance emotions, such as worry and nervousness, in the context of avoidance goals. This indicates that individuals with higher levels of BPF perceive avoidance/negative emotions as unhelpful when faced with threatening tasks. This is consistent with Linehan's Biosocial theory, which suggests that invalidating environments during childhood teach individuals with high levels of BPF that their negative emotion experiences are wrong (Linehan, 1993). Based on this theory it would be expected that negative emotions are perceived as having a low utility regardless of context. However, BPF did not predict implicit perceived utility in the context of approach goals, for example, when trying to obtain success. A possible explanation for this is that



individuals with high levels of BPF implicitly perceive avoidance emotions as unhelpful in the context of avoidance goals due to their overwhelming intensity. It has previously been reported, consistent with findings from study 2b of this thesis, that individuals with high levels of BPF experience intense emotions (Ebner-Priemer et al., 2007; Yen et al., 2002). Furthermore, it is reasonable to expect that avoidance emotions, such as worry and nervousness, would be higher when one is trying to avoid harm than when one is trying to obtain success. Therefore this increased intensity may be responsible for perceptions of avoidance emotions as unhelpful as they may be overwhelming and threaten the success of the avoidance goal.

According to appraisals theory (Lazarus, 1991; Scherer, 2013), the appraisal of a situation as harmful to the attainment of a goal triggers behavioural, experiential and physiological negative emotion responses. Therefore, the appraisal of these emotional responses as unhelpful may, in turn, trigger the development of further negative emotion, resulting in negative emotion cascades similar to those hypothesised in the emotional cascades model of BPF (Selby & Joiner, 2009). Consequently, implicit perceptions of negative emotions as unhelpful may contribute to the rapid escalation of negative emotional intensity associated with BPF.

Theoretically, this may facilitate understanding of study 2b findings, which showed individuals with high levels of BPF regulate their negative emotions at higher emotional intensities. Appraisals theories acknowledge that some appraisals, such as whether the situation is perceived as a benefit or threat to one's goal, can occur implicitly, that is, outside of conscious awareness (Scherer, 2013). Therefore the implicit perception that negative emotional responses are unhelpful may lead to a rapid increase in emotional intensity during the generation of the emotion. This means that

the emotion may already be at a high intensity when it reaches conscious awareness and may explain the increased negative emotion intensity found in study 2b.

### **8.3. Positive Emotion regulation**

Findings from study 1 suggest that individuals with high levels of BPF demonstrate knowledge of a range of helpful and unhelpful strategies to regulate positive emotion but may experience difficulty in the implementation of some helpful strategies. More specifically these individuals described problems in maintaining their attention on positive aspects of a situation or experience. Consistent with this, in study 2a these individuals were found to use less helpful strategies, which require maintained focus on positive aspects of a situation and more unhelpful strategies, which tend to involve attention being diverted away from current positive stimuli. However, it must be acknowledged that findings from study 2a were only present when not controlling for mood disturbance and cluster B personality scores and the implications of this are discussed in detail later in this chapter.

Taken together these findings suggest that individuals with high levels of BPF have sufficient knowledge of positive emotion regulation strategies but experience difficulty implementing these strategies due to poor attentional control. More specifically these individuals seem to have difficulty in focusing and maintaining attention on positive aspects of situations or experiences. This finding lends support to Linehan's biosocial theory (Linehan, 1993), which postulates that an inability to distract ones attention away from negative emotion stimuli may be an important part of the emotion regulation problems experienced by individuals with high levels of BPF. This finding is also consistent with the emotion cascade model (Selby & Joiner, 2009) and supporting research (Baer & Sauer, 2011; Selby et al., 2009; Selby & Joiner, 2013), which suggests that these individuals have a tendency to ruminate on even small

negative events. This rumination, which involves focusing one's attention on negative aspects of a situation together with its causes and likely negative consequences, increases the intensity of the negative emotion thus making it more salient, attracting further attention, and therefore encouraging rumination. As a result it is proposed that this cycle is self-perpetuating and makes it difficult for these individuals to divert their attention away from the negative stimuli. This is also consistent with findings regarding negative emotion regulation in this thesis, which indicate that high levels of BPF are associated with increased use of rumination. Consistent with past research this highlights one way in which negative emotion regulation processes may have a negative impact on positive emotion regulation (Brans, Koval, Verduyn, Lim, & Kuppens, 2013).

Findings from study 2b also demonstrate that when individuals with high levels of BPF regulate their positive emotions, they do so for shorter periods of time. It is theorised that this may also result from difficulty maintaining positively focused attention. The ability to focus and maintain attention on positive aspects of a situation is central to helpful positive emotion regulation strategies such as savouring, which involves deliberately directing attention towards one's positive experiences (Bryant, 1989) and positive mental time travel, which involves vivid reminiscence or anticipation of positive events (Quoidbach, Hansenne, & Mottet, 2008). If the individual is unable to maintain positively focused attention this may shorten the time considered to be actively regulating positive emotions. In practical terms this means that whilst engaging in emotion regulation strategies such as savouring, to increase positive emotions, individuals with high levels of BPF are more likely to have their attention distracted by negative or irrelevant stimuli. The individual may then perceive this diversion of attention away from positive stimuli as the end of the emotion regulation attempt thus reducing the reported duration of the attempt.

Consistent with this interpretation, Domes et al. (2006) suggest that individuals with high levels of BPF to have difficulty focusing and maintaining attention on positive events and experiences. This was evidenced in a directed forgetting task where individuals with a diagnosis of BPD were found to recall more negative words from the ‘to forget’ list and less positive words from the ‘to remember’ list (Domes et al., 2006). Based on this finding it appears that the presence of this negative attention bias may also have a detrimental impact on the processing of positive emotional stimuli. However, other research using an adolescent sample of females with mixed psychiatric diagnoses reported that BPD specifically was not associated with a negative attention bias (Von Ceumern-Lindenstjerna et al., 2010). Instead it was found that individuals with BPD demonstrated a large significant association between negative mood and an attentional bias for negative emotional faces. In line with this, when Domes et al. (2006) controlled for positive and negative affect as covariates, effects for negative stimuli inhibition disappeared. Consistent with findings from this thesis, this suggests that negative attention biases may result from mood disturbance within this population rather than BPF specifically.

Overall, findings that individuals with high levels of BPF appear to experience difficulties in some aspects of positive emotion regulation is consistent with Biosocial theory (Linehan, 1993), which suggests that although negative emotion regulation difficulties may be more pronounced, individuals with high levels of BPF are also likely to experience difficulty in some areas of positive emotion regulation. However present findings expand this theoretical perspective by suggesting that the ability to sustain positive attention focus overtime may be particularly problematic in this population, preventing the effective use of positive emotion regulation strategies. This highlights another potential target for treatment: improving attention control. Working to improve attentional control would help to provide individuals with high levels of BPF with the

skills necessary to implement a range of helpful emotion regulation strategies. This would be highly valuable as findings in this thesis suggest that these individuals already have knowledge of helpful strategies but may require support in learning to implement the strategies effectively

#### **8.4. Strengths of the thesis**

The research contained in this thesis makes several important contributions to knowledge in the field of emotion regulation and BPF. Firstly, this thesis explored features of emotion regulation in a non-clinical, student sample. This is an important addition to research using clinical samples, as sub-threshold BPF are more prevalent in the general population and have a significant negative impact on interpersonal functioning, academic achievements and increase risk of mood disorder (Trull et al., 1997). To date research exploring emotion regulation within this population has focused on the use of individual unhelpful emotion regulation strategies. This ignores the potential for a range of strategies, including helpful strategies such as reappraisal, to be used in this population. Study 1 was the first study to explore the range of emotion regulation strategies used within this population. The use of qualitative techniques allowed self-generated reports of the range of emotion regulation strategies used by individuals with high and low levels of BPF to be explored. Thus study 1 made an important and unique contribution to the literature by demonstrating that individuals with high levels of BPF have knowledge of and use a wide range of helpful and unhelpful strategies for positive and negative emotion regulation. Study 2a has further built on this by quantifying the use of unhelpful *and helpful* emotion regulation strategies within this population. This showed that whilst individuals with high levels of BPF appear to have sufficient knowledge of helpful strategies they choose to implement more unhelpful and less helpful strategies when regulating negative emotions.

The emotion regulation literature has identified that the intensity of emotions to be regulated and the duration of emotion regulation attempts can have a major impact on emotion regulation success. Using experience sampling methodology study 2b was the first study to explore the intensity of emotions at the point of regulation and duration of emotion regulation attempts in relation to BPF. Findings from study 2b therefore go beyond past research that has investigated overall emotion intensity and instability in this population by specifically identifying the intensity at the time an emotion regulation attempt occurs. It was found that after controlling for general emotion intensity, the intensity at the time that emotion regulation attempts were made was higher in individuals with high levels of BPF. This finding makes an important theoretical contribution to the literature by indicating that individuals with high levels of BPF wait until later in the emotion generative process, when emotion intensity is high, before attempting to regulate the emotional response. This suggests that high emotion intensity may be a cause as well as consequence of emotion regulation difficulties.

The past theoretical and empirical emotion regulation literature has also highlighted the importance of implicit motivation in determining emotion regulation behaviour (Tamir et al., 2007). Study 2c of this thesis explored the presence of implicit evaluations of emotions and emotion regulation in this population, and identifies low perceived utility for negative emotions when faced with harm avoidance tasks. This provides an innovative understanding of the implicit processes that may drive unhelpful emotion regulation attempts.

In past research there has been a heavy focus on the regulation of negative emotions despite reports that positive emotionality is an important feature in recovery from BPD (Reed et al., 2012) and has been found to facilitate the effective regulation of negative emotions. Research included in this thesis explored *positive* emotion

regulation process and identified areas of difficulties in positive emotion regulation within this population. For example, it was found that individuals with high levels of BPF report difficulties engaging and maintaining attention on positive aspects of situations and internal experiences; a crucial skill for effective positive emotion regulation.

The overall findings from this thesis are consistent with biosocial theory (Linehan, 1993), demonstrating that whilst emotion regulation problems associated with BPF are more pronounced in negative emotion regulation processes it appears that these individuals do experience some difficulties in positive emotion regulation. In addition findings have developed understanding of the types of difficulties and deficits these individuals may experience during the regulation of positive and negative emotion highlighting important areas for further research and treatment targets.

### **8.5. Limitations of the Thesis**

Limitations relating to individual studies have been discussed in the relevant empirical chapters. Here the focus will be on the limitations of the thesis as a whole. Firstly, the majority of research included in this thesis was based on a predominantly female sample. This may limit the ability to generalise findings to male populations, especially given the finding from study 2b indicating that males are less likely to report active attempts to regulate their emotions. This finding may be taken as an indication that males and females differ in their approach to emotion regulation. Further research is required to explore potential gender differences in emotion regulation and if/how this relates to BPF.

Secondly, the studies included in this thesis explored the relationship between the presence of BPF and a number of factors known to influence emotion regulation success. However, this thesis did not explore how these factors may interact with each

other. For example, in study 2b the relationship between BPF and intensity of emotion was investigated and the relationship between BPF and the duration of emotion regulation attempts were investigated. Yet, neither of these analyses took into account the type of strategy being used and how this may impact on the relationship. As a result further research is needed to explore interactions between individual types of emotion regulation strategy, the intensity of the emotion to be regulated and the duration of emotion regulation attempts in this population. In addition the current thesis did not explore how each of the emotion regulation factors, such as type of strategy, emotion intensity, duration of emotion regulation, impacted on emotion regulation success within the current sample. Therefore it can only be inferred but not concluded that these factors contribute to emotion dysregulation within this population.

Thirdly, it is suggested that the finding from this thesis that individuals with high levels of BPF use more unhelpful emotion regulation strategies may be as a result of the higher emotion intensity at the point of emotion regulation. This is based on past research demonstrating that increased emotion intensity is associated with the selection of disengagement strategies (Sheppes et al., 2012). However as individual strategy types were not analysed, it cannot be concluded that the increase in unhelpful strategies reported was as a result of more disengaging strategies, as unhelpful engagement strategies, such as rumination, were also included in the questionnaire. Future research to clarify whether BPF is associated with increased use of disengagement strategies rather than engagement strategies would be useful to add clarity.

Fourthly, throughout this thesis emotion intensity measures have been based solely on self-report assessments, which are susceptible to perception bias. Whilst this approach may provide information on the intensity of subjective experience this is only one component of an emotional response. Further research may want to also explore



physiological and behavioural measures of emotion intensity in order to provide a more comprehensive account of the construct.

Finally, the decision to control for co-morbidity factors, such as mood disturbance and other cluster B personality features may have been too stringent eliminating variance which would otherwise be attributed to BPF. This is supported by the removal of these factors as control variables leading to BPF becoming a significant predictor, where before it was not. To further complicate matters it is then difficult to establish whether findings are to be interpreted as attributable to co-morbidities rather than BPF themselves or whether mood disturbances and general cluster B personality features are indeed a part of BPF. The latter interpretation is supported by the decision to include the pathological personality traits of anxiousness and depressivity as diagnostic features of borderline personality disorder in the alternative model of personality disorder in DSM 5 (American Psychiatric Association, 2013). Similarly cluster B personality disorders, including BPD, are grouped together as they are all associated with dramatic emotional behaviour (American Psychiatric Association, 2000). Therefore this shared feature may be considered a part of the borderline personality construct, which should not be controlled for. The decision of whether they are to be conceptualised as co-morbidity features and controlled for or as part of the borderline personality construct is beyond the scope of this thesis. However, this is an important issue that should be considered when interpreting findings.

## **8.6. Implications and Concluding Remarks**

The findings derived from this thesis come from research in a non-clinical student sample and may not accurately reflect emotion regulation processes in clinical samples where more extreme levels of BPF are likely to be found. However, findings from the current thesis do highlight specific areas for further investigation within clinical populations. It is hoped that, following publication, research included in this

thesis will stimulate research to explore specific features of emotion regulation that may be problematic for individuals meeting diagnostic thresholds for BPD. Nevertheless, subject to replication in larger community based and gender balanced samples; the current findings could have important implications for non-clinical support services in educational and community settings. These will now be discussed.

The findings from this thesis indicate that individuals with high levels of BPF demonstrate sufficient knowledge of a range of helpful and unhelpful emotion regulation strategies for the regulation of positive and negative emotions. However it appears that these individuals choose to use more unhelpful strategies when regulating their emotions. This could have important implications for supporting these individuals in non-clinical community or educational support services. For example, this finding highlights the need for interventions to develop skills that facilitate the implementation of strategies rather than focusing on expanding knowledge of helpful strategies, which may already be present. In addition research in this thesis has identified several potential targets for such interventions.

Firstly, findings highlight that difficulties in diverting attention away from negative stimuli toward more positive stimuli and maintaining attention of positive stimuli may contribute to the unhelpful pattern of strategy use for both positive and negative emotion regulation. Therefore findings support the use of mindfulness meditation practices to increase awareness of positive emotions (Carl et al., 2013) and cognitive bias modification programs for attention to improve abilities to disengage from negative stimuli, which have already shown potential for correcting cognitive bias within the broader spectrum of emotional disorders (Koster, Fox, & MacLeod, 2009). The implementation of these techniques may be an important precursor to the use of a range of helpful strategies, such as reappraisal and savouring. In addition such

programmes may also support a reduction in the use of the unhelpful strategy of rumination, which has been associated with BPF in this thesis and consistently throughout the literature (e.g. Baer & Sauer, 2011; Selby et al., 2009).

Secondly, research in this thesis has indicated that individuals with higher levels of BPF tend to regulate their negative emotions when they are more intense. Past research has demonstrated that emotion intensity at the point of regulation can have a negative influence on strategy selection and emotion regulation success (Sheppes & Meiran, 2007, 2008; Sheppes et al., 2012, 2011). Therefore these individuals may benefit from training in skills to identify emotions early as they start to develop or to identify environmental precursors to emotional responses. This would facilitate the individuals to engage in emotion regulation activities earlier, when intensity is low, to prevent the development of intense emotions that may be difficult to manage.

Alternatively, interventions that promote distress tolerance in the pursuit of long term emotion regulation goals may also be beneficial in this population. This is because past research has demonstrated that negative emotion regulation during high emotion intensity may necessitate longer periods of emotion regulation (Sheppes & Meiran, 2007). Distress tolerance is already a central part of commonly used treatments in clinical populations, such as Dialectical Behaviour Therapy which seek to promote distress tolerance through the use of mindfulness skills. Findings from this thesis demonstrate that some aspects of clinical intervention, such as the use of mindfulness to promote distress tolerance, may also be beneficial for in non-clinical student populations.

Findings from study 2c highlight that the implicit perceptions regarding the utility of negative emotions held by individuals with high levels of BPF may have important implications for emotion experience and regulation. Furthermore, implicit

beliefs have been found to be particularly resistant to change (Gregg et al., 2006), which may explain the difficulty to treat individuals with extreme levels of BPF sufficient to BPD diagnostic thresholds (Stone, 2006). As a result this finding highlights the need for research to explore approaches to challenge and change implicit beliefs and to explore how these approaches can be integrated into existing interventions.

Overall the findings from this thesis make a substantial theoretical contribution to the field of BPF by extending past theory and research that highlights the presence of emotion dysregulation within this population and exploring how individuals with high levels of BPF attempt to regulate their emotions and why this may be problematic. More specifically the findings from this thesis, guided by past theory and research, highlight a number of characteristic features of emotion regulation in this population, which may be problematic. In doing so this research has highlighted several important specific targets for treatment and future research. In addition the features identified in this non-clinical population may also be an indication of the problematic features in clinical populations, where emotional disturbances may be more severe. As a result it is hoped that, once published, the findings of this thesis will have important implications in directing research in clinical settings to gain a better understanding of factors contributing to emotion dysregulation in BPD.

## Appendices

### Appendix 1 – Targeted Recruitment Poster

***Would you like to take part in research, help contribute to the understanding of how people manage emotions and earn up to £20 in Love to Shop Vouchers?***

**Do You:**

- Act without thinking e.g. spending more than you can afford, engage in risky behaviours?
- Have concerns about being left by others?
- Experience very strong emotions?
- Experience rapidly changing moods?
- Sometimes find it hard to control anger?
- Tend to feel let down by others?
- Ever hurt yourself on purpose?

**If you answer yes to any of the above questions we would like to know more about if/how you try to influence the emotions you experience in your daily life. All UCLan students confident in written and spoken English are invited to participate in this study.**

Participation will involve completing questionnaires, reporting on emotional experiences over a 7 day period and taking part in computer based tasks. Participants will be compensated for their time with love to shop high street vouchers - first and second year psychology students may choose to be awarded SONA participation credits in place of high street vouchers.

**If you are interested in taking part in this study or would like to find out more information please contact me using the details below**

**Email: [cporter2@uclan.ac.uk](mailto:cporter2@uclan.ac.uk), Tel: 01772 894461**

HOW DO YOU INFLUENCE THE EMOTIONS YOU EXPERIENCE?

**Excitement? Sadness?**  
**Anger? Happiness? Fear?**

Would you like to gain a better understanding of how you regulate your emotions?

We are currently recruiting participants to take part in our research study investigating how individuals experience and regulate emotions in their everyday lives and how this may be associated with personality features. All participants will receive personalised feedback on the strategies they current use to regulate emotions and how emotion regulation may be improved.

Please note that all individuals fluent in spoken English are invited to participate in this study, including individuals with a current or previous personality disorder or mood disorder diagnosis. If you do have a current or past diagnosis, please do not disclose this information to the researcher as this may compromise the study findings.

**Participation will involve:**

**An informal one to one interview to discuss your experiences of emotion and emotion regulation.**

**completing some short questionnaires**

**If you are interested in participating please contact the researchers using the contact details below or find this study on the SONA system.**

**Email: [cmporter@uclan.ac.uk](mailto:cmporter@uclan.ac.uk) Tel: 01772 894461 or 07927340961**

**\*Psychology students will receive participation points for this study.**

### Appendix 3 – Experience Sampling Methodology Acceptance Survey

<b>Sample Information</b>			
Total sample size N=108			
Mean age	23.74		
No of Males	25	23%	
No of Females	83	77%	
Undergraduate	77	71%	
	<b>Response</b>	<b>Number of Participants</b>	<b>Percentage</b>
<b>Prompt Method</b>	Watch	5	5%
	Pager	1	1%
	Text	86	77%
	App	18	17%
	Email	4	4%
<b>Number of prompts per day</b>	<5	42	39%
	5 to 10	55	51%
	11 to 15	8	7%
	16 to 20	3	3%
	21 to 25	1	1%
	26 to 30	1	1%
<b>Time to complete each prompt</b>	5 mins	80	74%
	7 mins	19	18.00%
	9mins	7	6%
	11mins	6	6%
	Other	2	2%
<b>No of Days willing to participate</b>	<5	38	35%
	6 to 10	32	30%
	11 to 15	37	34%
	Other	2	2

## Appendix 4 – Experience Sampling Diary

Day 1

Prompt No 1

Time.....

### Q1.

This scale consists of a number of words that describe different feelings and emotions. Please read each item carefully and indicate to what extent you feel this way **right now, that is, at the present moment**.

Please use the above scale and write your response next to each of the 20 feelings listed below:

1	2	3	4	5
Very Slightly or not at all	A little	Moderately	Quite a bit	Extremely

_____ Interested	_____ Guilty	_____ Irritable	_____ Alert
_____ Distressed	_____ Scared	_____ Determined	_____ Attentive
_____ Excited	_____ Hostile	_____ Ashamed	_____ Jittery
_____ Upset	_____ Enthusiastic	_____ Inspired	_____ Active
_____ Strong	_____ Proud	_____ Nervous	_____ Afraid

From "Development and validation of brief measures of positive and negative affect: The PANAS scales," by D. Watson, L. A. Clark, and A. Tellegen, 1988, Journal of Personality and Social Psychology, 54, 1063-1070. Copyright © 1988 by the American Psychological Association. Reproduced with permission. No further reproduction or distribution is permitted without written permission from the American Psychological Association.

### Q2.

Please think back over the period since your last prompt (or the last 2 hours if this is your first prompt) about any thoughts and emotions that you experienced. First you need to think about the most negative emotion you have experienced (e.g. angry, sad, or nervous). Please briefly describe your most negative experiences below (e.g. I felt sad because I got a bad grade).



.....

.....

.....

.....

.....

.....

**Q3.**

Did you make a conscious effort try to influence the emotion you describe in question 2?

Yes

No (if NO please go to question 8)

**Q4.**

Please think back to just before you attempted to influence the negative emotion and indicate to what extent you felt each of the 10 feelings below using the scale provided.

1	2	3	4	5
Very Slightly or not at all	A little	Moderately	Quite a bit	Extremely

\_\_\_\_\_ Distressed

\_\_\_\_\_ Irritable

\_\_\_\_\_ Upset

\_\_\_\_\_ Ashamed

\_\_\_\_\_ Guilty

\_\_\_\_\_ Nervous

\_\_\_\_\_ Scared

\_\_\_\_\_ Jittery

\_\_\_\_\_ Hostile

\_\_\_\_\_ Afraid

**Q5.**

Did you try to (please circle):

Increase the negative  
emotion?

Maintain the negative  
emotion?

Decrease the negative  
emotion?

**Q6.**

Please describe how you tried to influence the emotion?

.....

.....

.....

.....

**Q7**

How long did you spend trying to influence this emotion (in minutes)?

.....

**Q8.**

Now we would like you to think about any positive emotions you have experienced since your last prompt (e.g. Happy, Excited or Pride). Please briefly describe your most positive experience below (e.g. I booked a holiday and felt excited).

.....

.....

.....

.....

.....

**Q9.**

Did you actively try to influence this emotion?

Yes                      No (If No your response for this prompt is complete)

**Q10.**

Please think back to just before you attempted to influence the positive emotion and indicate to what extent you felt each of the 10 feelings below using the scale provided.

1	2	3	4	5
Very Slightly	A little	Moderately	Quite a bit	Extremely

---

or not at all

---

\_\_\_\_\_ Interested

\_\_\_\_\_ Alert

\_\_\_\_\_ Excited

\_\_\_\_\_ Inspired

\_\_\_\_\_ Strong

\_\_\_\_\_ Determined

\_\_\_\_\_ Enthusiastic

\_\_\_\_\_ Attentive

\_\_\_\_\_ Proud

\_\_\_\_\_ Active

**Q11.**

Did you try to (please circle):

Increase the positive  
emotion?

Maintain the positive  
emotion?

Decrease the positive  
emotion?

**Q12.**

Please describe how you tried to influence the emotion

.....

.....

.....

.....

.....

**Q13**

How long did you spend trying to influence this emotion?

.....

**End of Prompt Response**

## **Appendix 5 - On Screen Instructions**

### **Lexical Decision Task On-screen Instructions:**

Welcome!

During this task information will be presented to you in the centre of the screen. You are required to read all information carefully and respond as quickly and accurately as possible. The task will be split into four blocks; you will be offered a one minute break between each block. The instructions will remain the same for each block.

Please Press the SPACE BAR to continue to instructions.

Instructions

Please read all information carefully. Your task is to decide if the red target word is a real word or a non-word. If the target word is a real word please press 'F' on your keyboard. If the target word is a non-word please press 'J' on your keyboard. It is important that you respond as quickly and accurately as possible. If you have any questions please speak to the researcher now.

Please press the SPACEBAR to start the task.

### **ER-IAT On-screen Instructions:**

Instructions

During this task you will be asked to categorise words into groups using your keyboard. The task is made up of 5 blocks. You will see new instructions before the start of each block. Please make sure you read all instructions carefully and respond as quickly and accurately as you can.

Press the SPACE BAR to continue.

Block 1

Words will appear one at a time in the centre of your screen. Your task is to differentiate between emotion expression and emotion control words.

If the word relates to emotion expression press 'F'.

If the word relates to emotion control press 'J'

Press the SPACE BAR to start Block 1

Block 2

Words will appear one at a time in the centre of your screen. Your Task is to differentiate between positive and negative words.

If the word is positive press 'F'

If the word is negative press 'J'

Press the SPACE BAR to start Block 2.

Block 3

Words will appear one at a time in the centre of your screen.

For emotion expression and positive words press the 'F' key

For emotion control and negative words Press the 'J' key

Press the SPACE BAR to start Block 3

Block 4

Words will appear one at a time in the centre of your screen. Your task is to differentiate between emotion control and emotion expression words.

For emotion control words press the 'F' key

For emotion Expression words press the 'J' key

Please press the SPACE BAR to start Block 4.

Block 5

Words will appear one at a time in the centre of your screen

For Emotion Control OR Positive words press the 'F' key

For Emotion Expression OR Negative words press the 'J' key

Press the SPACE BAR to begin Block 5

## Appendix 6 – Lexical Utility Task Stimuli

Avoidance Goals	Approach Goals
avoid failure	succeed
live up to expectations	do better than expected
avoid making poor choices	make the best choices possible
concentrate on preventing undesirable outcomes	focus on achieving the best outcome

Avoidance Emotions	Approach Emotions
nervous	excited
worried	elated

High Utility Words	Low Utility Words	Non-Words	
helpful	reject	pipul	secarded
necessary	risky	construmtin	suksete
accomplish	failed	pichful	horvist
welcomed	futile	vidtful	pownes
useful	confused	filtip	heaspy
attained	worse	benkp	arfinat
needed	waste	mequrde	corfert
desirable	ruin	rinder	torny
practical	devastate	meckop	gruvial
fine	disruptive	viryson	tuirgh
better	bad	renferent	moniph
reach	wrong	baded	plodin
right	danger	shalkes	corph
required	unnecessary	danmat	galiteous
superior	pointless	burdel	lobudamy
essential	redundant	muber	fandeto



## **Appendix 7 – Study 1 Information Sheet**

### **Participant information sheet**

#### **Participant ID number:**

**Study Title:** Investigating Experiences of Emotion and Emotion Regulation in a Student Population with Emotionally Unstable Personality Features

#### **Researchers Name and Contact Details:**

Primary Researcher: Carly Porter (PhD student):

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#### **Supervisors:**

Dr Kathryn Gardner (kjgardner@uclan.ac.uk)

Dr Pamela Qualter (pqualter@uclan.ac.uk)

#### **What is the purpose of the study?**

It is becoming increasingly accepted that problematic personality functioning (i.e. personality disorder and personality traits that interfere with daily functioning) exists on a continuum with healthy personality functioning and can be assessed in the general population. This study is investigating “emotionally unstable” personality features which are characterised by intense rapidly changing emotions, anger, impulsivity, problems in interpersonal relationships, problems in personal identity and self-harming behaviour. It has been suggested that this group of personality features are mainly due to problems in emotion regulation. As a result this study aims to gain an in-depth understanding of how individuals with low versus high levels of emotionally unstable personality features experience and regulate their emotions. **\* Please note this study does NOT diagnose personality disorders. Instead this study will use simple self-report measures of emotionally unstable personality features present within the general population.**

In addition, this study seeks to identify your opinions towards experience sampling methodology (ESM). ESM is a technique whereby participants are asked to carry with them a small questionnaire booklet (known as an ESM diary) containing questions of

interest to the researcher, and the participant will then be prompted several times a day to complete the questions.

### **What will I be asked to do if I participate?**

Participation will involve taking part in a one-to-one interview, lasting approximately 30-45 minutes, where you will be asked to talk about your experiences of emotion and how you regulate emotions in your day to day life. The interview will be informal in style and you may choose not to answer any of the questions if you wish. You may also request breaks or choose to stop the interview at any time. All interviews will be digitally recorded and transcribed to allow analysis of responses at a later date.

Interview data will be stored in an anonymous format (with no identifiable information other than your unique participant identification number) in a password protected database for a period of 6 years. After this all data will be destroyed. In addition, you will be asked to complete some questionnaires assessing emotionally unstable personality features, emotion regulation strategies and experience sampling methodology. Finally, you will complete a few short questionnaires to assess control variables in this study including: depression, antisocial, attention-seeking and self centred personality features.

A five minute break is recommended between the interview and questionnaires. Breaks will also be offered throughout the interview and you may request a break or to discontinue participation at any point during participation. The estimated total participation time is 1 hour 45 minutes (45 minute interview, 45 minute questionnaires 15minute optional break allocation)

### **Are there any benefits?**

All participants will be offered personalized feedback on their emotion regulation profile, this will provide information on what types of strategies you use in different situations and where appropriate what alternative strategies may be more effective. Participants currently enrolled on an undergraduate psychology course at the University of Central Lancashire will be awarded participation points for their participation. You will also be contributing to our understanding of how individuals with emotional and impulsive traits and behaviours manage their emotions, which could inform intervention strategies.

### **Are there any risks?**

Risks include the sensitive nature of some questions including topics such as: self-harm, suicide, violence, crime and depression, which may be distressing for some individuals, therefore you will be provided with contact details for support services. These sensitive topics only appear on the questionnaires you will complete; you will not be asked about these issues in the interview.

### **How is confidentiality and anonymity ensured?**

All paper questionnaires and interview recordings will be stored in a secure location and will be labelled only with your unique ID number. Once your data are in an electronic

database, this database will be password protected and will again only be labelled with your unique participant identification number. Your data will therefore be anonymous. Your signed consent form will be stored separately to any study data. Only members of the research team will have access to this data. Some individual pieces of text may be published in academic journals and presented at conferences. This information will be completely anonymous.

### **Exceptions to confidentiality and anonymity**

During the consenting process we will ask for your name and contact details. This information will not be attached to your data and will be stored separately in a secure location. The only reason your name and contact details will be used is in the instance that you indicate risk to others or yourself, such as self-harm. If this happens we may disclose your details to relevant people (e.g., University Counselling services) and you will be informed before any information is passed on.

### **What if I change my mind about being in the study?**

You are free to change your mind about participation at any point without giving reason and without penalty. If you choose to withdraw, please consider whether you would simply no longer like to participate, or if you would additionally like any information provided so far to be removed from the study databases. You can inform the research team that you would like to withdraw either face to face during the interview session, or by using the contact details and quoting your unique participant information number which are both at the top of this page. Researchers must be informed on intent to withdraw before 14<sup>th</sup> February 2012, after this date data will have been anonymously analysed and prepared for publication.

### **What if I have Further Questions?**

Questions about the research project are always welcome and you may contact the researcher with questions using the contact details at the top of this page.

**Thank you for considering participation in this study, if you wish to participate in this study please complete the attached consent form.**

**The Counselling Service at the University of Central Lancashire** is staffed by a team of professionally trained and experienced professionals. This is a free, confidential service to all registered UCLan students which is open throughout the year except, during short periods over the Christmas and Easter Breaks.

The counselling service can be found on campus in - Foster Building 119 (First Floor)  
Appointments Available: Monday – Thursday 8.30-5.00; Friday 8.30-4.00  
Telephone: 01772 - 892572  
Telephone from outside the UK: +44 – 1772 - 892572  
Email: CoRecep@uclan.ac.uk

**Samaritans** is a confidential emotional support service for anyone in the UK and Ireland. The service is available 24 hours a day for people who are experiencing

feelings of distress or despair, including those which may lead to suicide. Contact details: Tel. 08457 90 90 90, Email: [jo@samaritains.org](mailto:jo@samaritains.org), Address: Chris, Freepost RSRB-KKBY-CYJK, PO Box 9090, Stirling FK8 2SA.

## **Appendix 8 – Study 2 Participant Information Sheet**

### **Would you like to participate in a research project exploring personality and emotion regulation?**

**Study Title:** Exploring the relationship between factors known to influence emotion regulation success and problematic personality traits.

#### **Researchers Name and Contact Details:**

Researcher: Carly Porter (PhD student)

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Tel: 01772 894461.

#### **Supervisors:**

Dr. Carol Ireland (Director of Studies)-CAIreland@uclan.ac.uk

Dr Mike Eslea – MJEslea@uclan.ac.uk

#### **What is the purpose of the study?**

It is becoming increasingly accepted that problematic personality functioning (i.e. personality features that interfere with daily functioning) exists on a continuum with healthy personality functioning. This means that low levels of problematic personality features are present and can be measured in the general population. This study is investigating personality features which are characterised by strong rapidly changing emotions, acting without thinking, difficulties in relationships with others, difficulties in personal identity and hurting oneself on purpose. It has been suggested that this group of personality features are due to problems in the management of emotion. This study aims to investigate how these personality features relate to how emotions are managed in everyday situations.

**\* Please note this study does NOT diagnose any potential disorders. Instead this study will use simple self-report measures of potentially problematic personality features present within the general population.**

#### **What will I be asked to do if I participate?**

There are three phases to participation.

### Phase 1

During phase 1 you will be given the opportunity to ask any questions and will be asked to provide consent to taking part in the research study. You will then be asked to complete some paper based questionnaires on personality and emotion management. You will be given instructions for phase 2 of the research project and asked to provide your mobile phone number. Your number will be stored in a password protected location and entered into a private password protected Google Calendar account which will be used to generate your text message prompts. Your mobile phone number will be used ONLY for the purpose of phase 2; you will not receive any telephone calls from the research team. Your number will not be shared and will be deleted on completion or withdrawal from the research project. Phase 1 should take approximately than 1 hour.

### Phase 2

During phase two you will be asked to carry with you a small paper diary at all times during your waking hours. The diary will contain a series of questions. You will then be prompted by text message at 6 time points randomly throughout the day. When prompted you should try to complete your ESM diary, this should take approximately 5 mins. It is important that you respond within 10 minutes of the prompt. It is ok if you miss some prompts, what is important is that you are honest and try to report within the 10 minute window where possible. Phase 2 will last a total of 7 days. After these 7 days you will be asked to return your ESM diary to the researcher and take part in phase 3.

### Phase 3

Phase three involves taking part in some computer based task where you will have to respond to stimuli on the screen as fast as possible whilst ensuring correct responses are given. You will also be asked to complete some questionnaires on mood and anxiety. Phase three should take approximately 1 hour.

### **Will I receive payment?**

We appreciate that participation in this type of research study requires a high level of commitment from research participants. As a result you will be paid £20 worth of love to shop vouchers (a high street gift voucher accepted at over 20,000 shops) in compensation for your time. Vouchers are allocated as follows:

Introduction session and questionnaires - £5

1-3 days ESM completion - £5

4-7 days ESM completion - £5

Completion of computer based implicit tasks £5

You may collect payment at these time points or all together on completion.

**Note for first and second year Psychology students:**

As an undergraduate psychology student if you would like to use the SONA system to recruit participants into your final year study you are required to have accumulated SONA 12 credits by the end of year 2. Therefore first and second year psychology students may choose to receive payment in the form of SONA participation points **OR** in love to shop vouchers.

**Are there any benefits?**

You will be contributing to our understanding of how individuals regulate their emotions relate to personality features, which could inform intervention strategies to help individuals experiencing difficulty in managing their emotions.

**Are there any risks?**

Risks include the sensitive nature of some questions including topics such as: relationships with others, emotions, hurting oneself on purpose, low mood and anti-social behaviour. This may be potentially upsetting for some individuals. You may choose to stop or withdraw at any time during or for up to 2 weeks following participation. You will also be provided with contact details for support services if you wish talk to somebody about any personal issues.

**How is confidentiality and anonymity ensured?**

All paper questionnaires will be stored in a secure location and will be labelled only with your unique ID number. This data will also be entered into an electronic database. Once data is entered into an electronic database your identification number will be removed. All electronic data will therefore be anonymous and your individual data will not be identifiable within the dataset. Your signed consent form will be stored separately to any study data. Data from this study will be stored for a period of 8 years, yet your personal details are not stored.

**What if I change my mind about being in the study?**

You are free to change your mind about participation and withdraw at any point during participation or for up to 2 weeks following participation. You do not have to provide a reason for withdrawal and will still receive payment for the period of time you took part. If you choose to stop participation early, please consider whether you would

simply no longer like to participate, or if you would additionally like any information provided so far to be removed from the study databases. You can inform the research team that you would like to withdraw either face to face meetings, or by using the contact details and quoting your unique participant information number which are both at the top of this page. Researchers must be informed on intent to withdraw within 2 weeks of participation as after this time your data will be completely anonymous and it will not be possible to identify your data within the full dataset.

### **What if I have further questions?**

Questions about the research project are always welcome and you may contact the researcher with questions using the contact details at the top of this page.

**Thank you for considering taking part in this study. Participation in this study is for research purposes only and the researchers are not qualified to deliver counselling services. If you are experiencing difficulties with your emotions or feel that you need to talk to somebody about problems you may have been experiencing, details of support services freely available to you are detailed below.**

**The Counselling Service at the University of Central Lancashire** is staffed by a team of professionally trained and experienced professionals. This is a free, confidential service to all registered UCLan students which is open throughout the year except, during short periods over the Christmas and Easter Breaks.

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## Appendix 9 - Study 1 Debrief

### Debrief

Thank you for participating in this study. Hard copies of questionnaires and interview recordings will be placed in a locked filing cabinet and are only accessible by the research team. Once the data has been input into a database, this database will be password protected. Your contact details will be stored separately from any study data you have provided, the *only* reason this information will be used is if during your interview you have revealed information suggesting risk of harm to yourself or others i.e. self-harm. You will be informed before the researcher passes on any of your identifiable information. If you wish to withdraw, you can do so now or contact Carly Porter at a later date (latest date = 14<sup>th</sup> February 2012), quoting your unique participation identification number which will allow the identification and withdrawal of your data.

**Participant Identification Number** (*to be completed by researcher for each participant*):

**Primary Researcher:** Miss Carly Porter (PhD student) – University of Central Lancashire,

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### **Supervisors:**

Dr Kathryn Gardner (kjgardner@uclan.ac.uk) and Dr Pamela Qualter (pqualter@uclan.ac.uk)

According to the biosocial theory of the development and maintenance of emotionally unstable personality features, these features are first and foremost a problem of emotion regulation caused by a biological vulnerability causing intense, reactive emotions and deficits in emotion regulation skills.

Previous research has suggested that a number of factors may influence the success of emotion regulation. First, the timing of an individual's emotion regulation attempts, that is, whether they make attempts to change the likelihood of an emotion occurring or attempt to change an emotion after it has occurred. Earlier emotion regulation attempts made before an emotion has occurred are more effective. Second, the level of information processing required for emotion regulation is also crucial. For example if you try to change the way you think of a situation to alter its emotional impact this requires you to first fully process the emotional information so that you could change the way you think about it. On the other hand, if you try to distract yourself from a situation to alter its emotional impact this can be done by looking away from emotional information without having to fully process it. Emotion regulation strategies that require you to fully process emotional information have been found more demanding and less effective when the emotion to be regulated is intense. Third, the longer you spend trying to regulate an emotion the more effective emotion regulation is.

As a result, this research aims to gain an in-depth understanding of how individuals experience and regulate emotions, and whether those individuals with higher levels of emotionally unstable personality features differ from those with low levels. In particular, this study aims to identify whether individuals from both groups believe that you can consciously influence the emotions you have, what types of emotion regulation strategies people from both groups use, why they use these strategies and whether or not they find these strategies effective.

To reiterate, this study used simple self report measures to identify the presence of personality features in the general population, and did not diagnose personality disorders.

Thank you again for participating in this research study, your time is a valued component of the research process. We hope that no distress has been caused as a result of your participation; however, if you do feel distressed there are contact details of some support services below.

Future research will explore how strategies are applied in everyday life e.g., how long an individual will actively try to regulate an emotion. If you would like to participate in this research please contact the researchers.

**Note: if you provided your email address and name to be contacted for Study 2, these will be stored in a separate password protected database and are in no way linked to this study.**

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## Appendix 10 - Study 2 Debrief

### Debrief

Thank you for participating in this study. Paper copies of questionnaires will be placed in a locked filing cabinet only accessible to the research team. Once the data has been inputted into a database, this database will be password protected. This data will be stored for a period of 8 years following the completion of this project. Your contact details will be stored separately from any study data. Your contact details will be deleted immediately following study completion or withdrawal. Your consent form, which details your name, will not be labelled with your unique participant identification number and will be stored in a separate location to any study data. This means your consent form will contain no information linking it to your data.

If you wish to withdraw, you may inform the researcher now or contact Carly Porter within two weeks of participation, quoting your unique participation identification number which will allow the identification and withdrawal of your data. After this time your data will not be identifiable within the dataset.

If you would like to receive information on the results of this study please contact Carly Porter using the contact details provided below.

**Participant Identification Number** *(to be completed by researcher for each participant):*

**Researcher:** Miss Carly Porter (PhD student) –  
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Email: [cmporter@uclan.ac.uk](mailto:cmporter@uclan.ac.uk),  
Tel 01772 894461

### **Supervisors:**

Dr Carol Ireland ([CAireland@uclan.ac.uk](mailto:CAireland@uclan.ac.uk)) and Dr Mike Eslea ([Meslea@uclan.ac.uk](mailto:Meslea@uclan.ac.uk))

This study is investigating how features that impact how successful we are at managing are emotions are related to potentially problematic personality features. This is because Biosocial theory suggests that the development of some potentially problematic personality features (e.g. acting without thinking and strong and rapidly changing emotions) can occur as a result of problems in how individuals manage their emotions. Previous research has suggested 3 factors that may influence how successful people are at managing their emotions.

These factors are:

- 1) How intense an emotion is when an individual consciously attempts to manage it.

- 2) The amount of time an individual spends trying to manage an emotion.
- 3) Implicitly (outside of conscious awareness) held beliefs about; managing emotions, the usefulness of emotions and the flexibility of emotion.

During session 1 you were asked to complete some questionnaires on personality and emotion management. The questionnaires used are designed to identify the presence of personality features in the general population, and did not clinically diagnose any personality issues.

The emotion intensity at the time when individuals try to manage emotion and the duration of attempts to manage emotions were explored using the daily reports you were asked to complete over a one week period. Implicit (automatic beliefs that exists outside of conscious awareness) beliefs about emotions were assessed using the computer based tasks and questionnaire that you were asked to complete during session 2.

This research will investigate whether the factors influencing how successful people are at managing their emotions (discussed above) are:

- 1) Related to how successful people are at managing their emotions
- 2) Related to difficulties in managing emotions
- 3) Related to personality features

Mood and anxiety scores will be used to assess that any findings are as a result of personality features.

**Thank you again for participating in this research study, your time is a valued component of the research process.**

We hope that no distress has been caused as a result of your participation; however, if you do feel distressed and would like somebody to talk to there are contact details of some support services below:

**The Counselling Service at the University of Central Lancashire** is staffed by a team of professionally trained and experienced professionals. This is a free, confidential service to all registered UCLan students which is open throughout the year except, during short periods over the Christmas and Easter Breaks.

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